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REPRODUCED FROM THE

ORIGINAL

National Builder

MARCH 1919 62

Leading Features in This Issue

A TWO-STORY BUNGALOW

with Supplementary Working Plans, and Quantity Survey
by Frank R. Walker

CRISIS IN SPECULATIVE BUILDING

By C. Stanley Taylor, Project Engineer

SPECIALIZED APARTMENT BUILDINGS

By Chas. E. White, Jr., Architect

INNOVATION in SMALL HOUSE DESIGN

By Rowland Otis

ARE YOU A BUILDER?

By Wm. Robinson Safford

COOLING A HOUSE

By Rowland Otis

And many other valuable illustrated practical articles.

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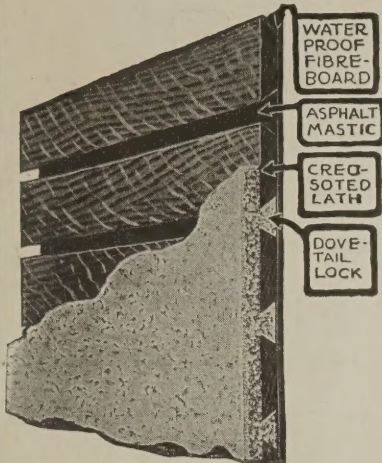
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This Creosoted, Dovetailed, Heavy Wood Strip on Asphalt Mastic and Water-proof Fibreboard

gives four advantages to the Contractor who wants permanent Stucco walls.

The dovetailed heavy wood strips lock the Stucco so that it welds with the Stucco Board into one perfect unit of rigidity. The creosote preserves the wood strips. The tough Asphalt Mastic and the water-proof fibreboard keep out cold, dampness, vermin and deaden sound. With one nail to each dovetailed key wood strip at every point where it crosses a stud, and four nails to each wood strip where used over sheathing, you get a solid wall as enduring as a monument.

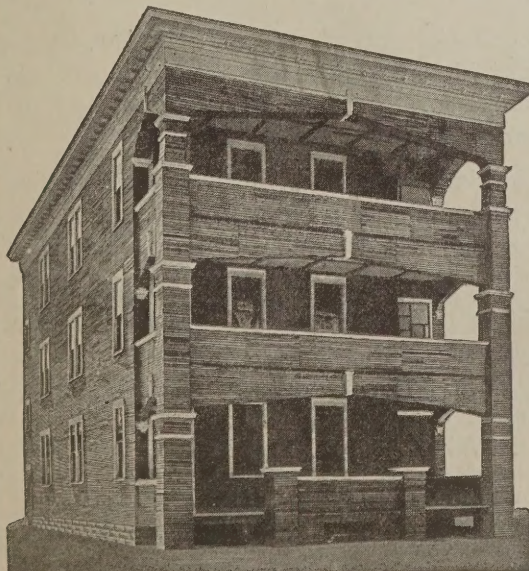
**FOR
EXTERIOR
WALLS**



**FOR
INTERIOR
WALLS**

makes walls almost as imperishable as stone. The strain is distributed evenly. Bishopric Board is both preserved and protected, naturally and scientifically, against dry rot, decay, swelling, shrinking and warping. With Asphalt backing on one side and cement on the other, the heavy wood strips are completely shut off from the elements of destruction.

Bishopric Board is built on the oldest known principle of wall construction. It has come into ever-increasing use because it is the *most economical Stucco background* produced and because it is also the safest and most dependable.



In interior use Bishopric Board makes sound-retarding walls, ceilings and partitions and saves plaster, time and labor.

Bishopric Sheathing saves about 40 per cent as compared with $\frac{7}{8}$ -inch wood sheathing. Makes a compact, damp-proof, sound-proof wall. No joints or knot holes.

Note the absolute rigidity of construction of this 3-family apartment house in Utica, N. Y., built for John J. Doyle. This building stood through the winter before being stuccoed. Bishopric Board was nailed direct to studding, no wood sheathing being used. Bishopric Board was also used on interior.

Our book, "Built on the Wisdom of Ages," tells you all you want to know about Bishopric Stucco Board—gives report of test after test—letter after letter—from Architect, Contractor, Engineer and Home Owner. Also contains a formula for a Stucco mixture that lasts. With this book we send samples of Bishopric Board and Bishopric Sheathing.

The Bishopric Manufacturing Company
907 Este Avenue, CINCINNATI, OHIO

National Builder

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TRADEPRESS PUBLISHING CORPORATION
542 SOUTH DEARBORN CHICAGO

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Vol. 62

MARCH, 1919

Number 3

A. H. McQuilkin, Editor

Advertising:
W. B. Mayor, L. M. Carroll, H. P. Sessions

Geo. P. Miller, Manager

To Builders---From the Editor

I promised last month to keep giving you a better paper and a more varied paper right along.

This number is better than the February number.

The April number will be better than this one.

And so on.

Jim T. Pomeroy has joined the editorial staff.

What will Jim do?

Suppose you had a thoroughly practical builder and engineer and draftsman—a man who has been in the contracting business himself, traveling over the country where building is going on, and reporting to you the latest things going into construction in the way of workmanship, engineering, and all that makes better building.

Wouldn't that be helpful to you?

That is what Jim is now doing.

His reports will appear in NATIONAL BUILDER each month.

Some of his work is in this issue.

I want to help builders with their actual problems. For instance, a builder wrote to me wanting to know the size of steel beams he should use on a certain style of construction, and so we produced a data chart on steel beams that covers all a builder would want to know on this subject at any time. This not only serves the builder who made the inquiry, but every builder as well who is building from his own plans involving the use of steel.

This chart is in this number with explanatory text.

Another builder a few days later wrote in asking about the size of trusses to use in a building.

Our answer is a chart giving data on trusses that is

not available to builders without engaging an engineer, who is not always convenient.

This data appears in this number also.

In this and other ways I am aiming to make the NATIONAL BUILDER show the live, practical work of the present day builder.

I am working to help you.

If you want to help you can do so by knocking anything in the paper that does not seem right. But give your reasons.

The world now stands for publicity—for open dealing.

That is what NATIONAL BUILDER is strong for. It is here to serve you as a real, practical worker with you in your business.

Its aim is to help you to make more and do better.

All its editorial pages are yours. No advertising or puffs of any kind are allowed in reading pages. When you subscribe for NATIONAL BUILDER you get all that you subscribe for.

I ask for knocks with all sincerity. They are the best things I can get to make me do better and better—which is my very earnest aim. And you cannot show your spirit of helping in any better way.

I would be less than human if I did not appreciate the many good words that have come praising the NATIONAL BUILDER. These are very grateful, but I don't want them to lull me to sleep. So tell me what you want. Where have I fallen short?

Send in your knocks.

Yours for better building,

THE EDITOR.

Free Lesson

Learn to Read BLUE PRINTS



Mail coupon today for this FREE LESSON. It will positively convince you that Plan Reading from Blueprints is not at all difficult—that by our new, easy method you can master it in a short time. You don't pay a cent for this lesson—now or at any other time—and your request for it places you under no obligation at all.

You are looking ahead to something better than working with the tools of your trade. Some day you hope to become foreman or superintendent in charge of building work—perhaps go into business for yourself. In any such case a knowledge of plan reading is absolutely necessary—and we want to show you how to get it.

Thousands of bright, energetic, capable men are being held back because they lack this knowledge. They are expert workmen but they seldom, if ever, get a chance to study the blueprints or have them explained. They must follow the lead of the man who does understand plan reading and directs their work.

We give you practical instruction in blueprint reading that you can apply to your everyday work. We place in your hands blueprints used in actual building work in Chicago and other cities, and send full instruction on every point. Every detail is carefully explained by practical contractors and builders—men in charge of construction work right here in Chicago. You get the benefit of their long years of practical experience. They give you the kind of knowledge that brings advancement and a fatter pay envelope.

Learn By Mail BUILDERS' COURSE Easy Payments

Just a few hours of your spare time at home each week devoted to study will enable you to master this Course in a surprisingly short time. Our lessons come to you by mail in convenient form for spare-time study—during evenings at home or at any other convenient time. Note the wide range of subjects covered

in this thorough, comprehensive and practical Builders' Course.

Throughout the entire course your instruction is under the personal guidance of our experts. Every subject is handled in a plain, straight-forward manner in language that you can easily understand. You are taught the things you need to know—and taught in such a way that you will remember them.

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COMPLETE COURSE INCLUDES

Plan Reading How to read a building plan. Floor plans and elevations. Use and meaning of different lines on the plan. Sections and section lines. Cross sections. How different materials are shown on the plan. How to read dimensions. Detail drawings. How to lay out work from the plans. Tracings and blue prints—how they are made. Practice in reading complete plans from basement to roof, etc., etc., etc.

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Estimating mill work. Labor and material for window and door

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Construction Brickwork: Footings and foundation walls of brick work, pointing, tuck pointing, etc. Brick and stone arches. Use of different kinds of stone.

Carpentry: Kinds and uses of woods, cornices, interior details, framing, roof construction, bridging, miter joints, butt points, etc. How plans are made. Complete instructions illustrated by working blueprints of all kinds of buildings, private, public and business.

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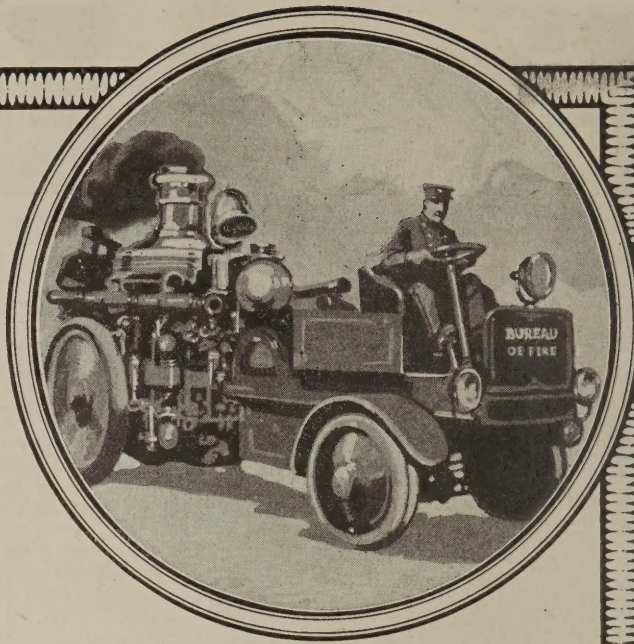
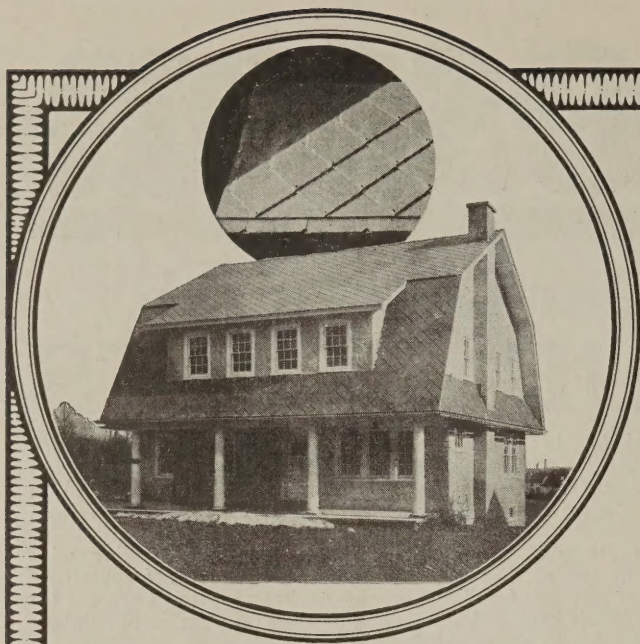
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Ambler Asbestos Shingles

prevent the fire. They protect the roof of your home from flying embers---which are practically always the cause of extensive conflagrations.

Made of the best Portland cement, reinforced with strong asbestos fibre, Ambler Asbestos Shingles are not only fire-proof, but wind, water and lightning-proof as well, and will never require painting nor repairing.

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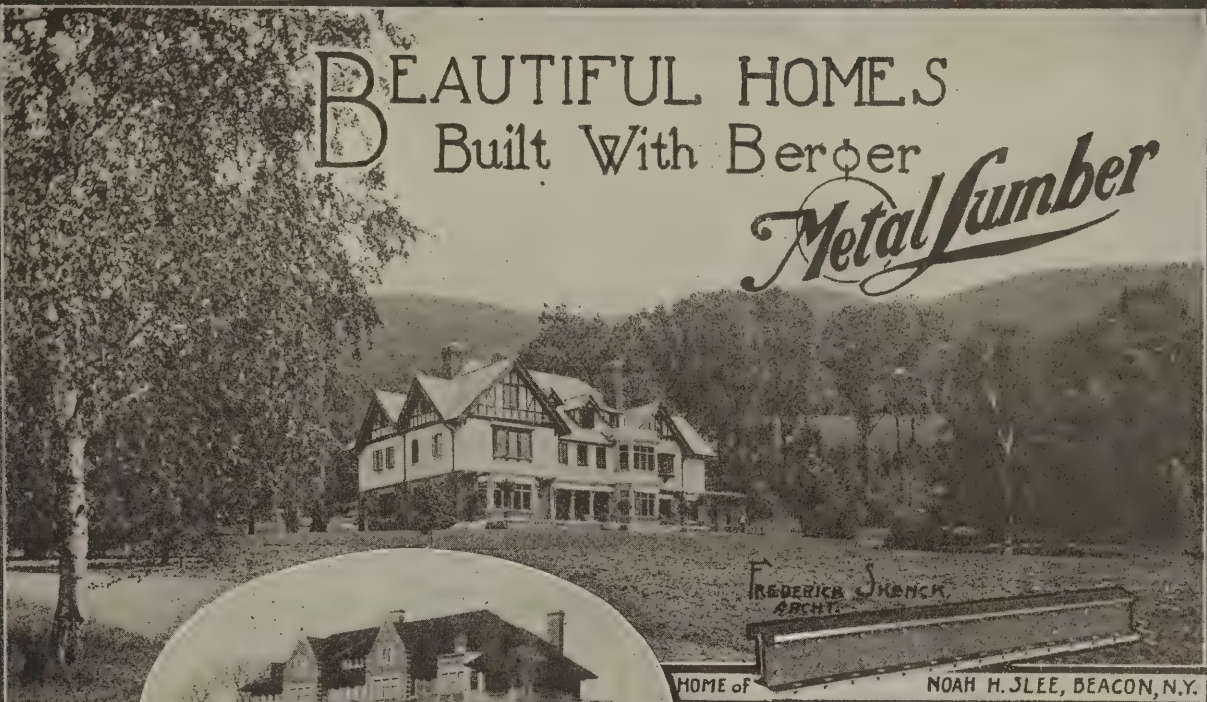
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Write today for further facts, pictures and prices

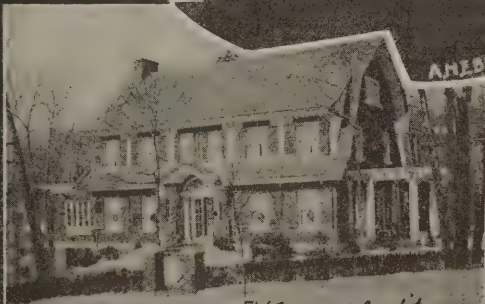
Keasbey & Mattison Co., Dept. B-4, Ambler, Pa., U.S.A.

Manufacturers of Ambler Asbestos Shingles, Asbestos Corrugated Roofing and Siding, 85% Magnesia Pipe and Boiler Covering and Asbestos Building Lumber

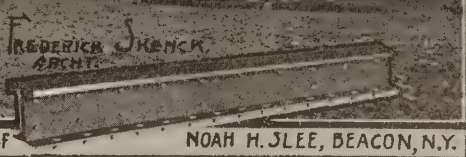
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WHEN beautiful homes are to remain beautiful and usable for generations, there is nothing better for the framing than the pressed steel joists and studs, called Metal Lumber.

While it is almost as light as wood framing it offers many points of superiority.

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Since it is cut to exact size and bolted firmly together there can be no "settling" of the structure to crack the walls and twist door frames.

If you do not know this material see Sweet's and write us at once for Technical Bulletin L-47.

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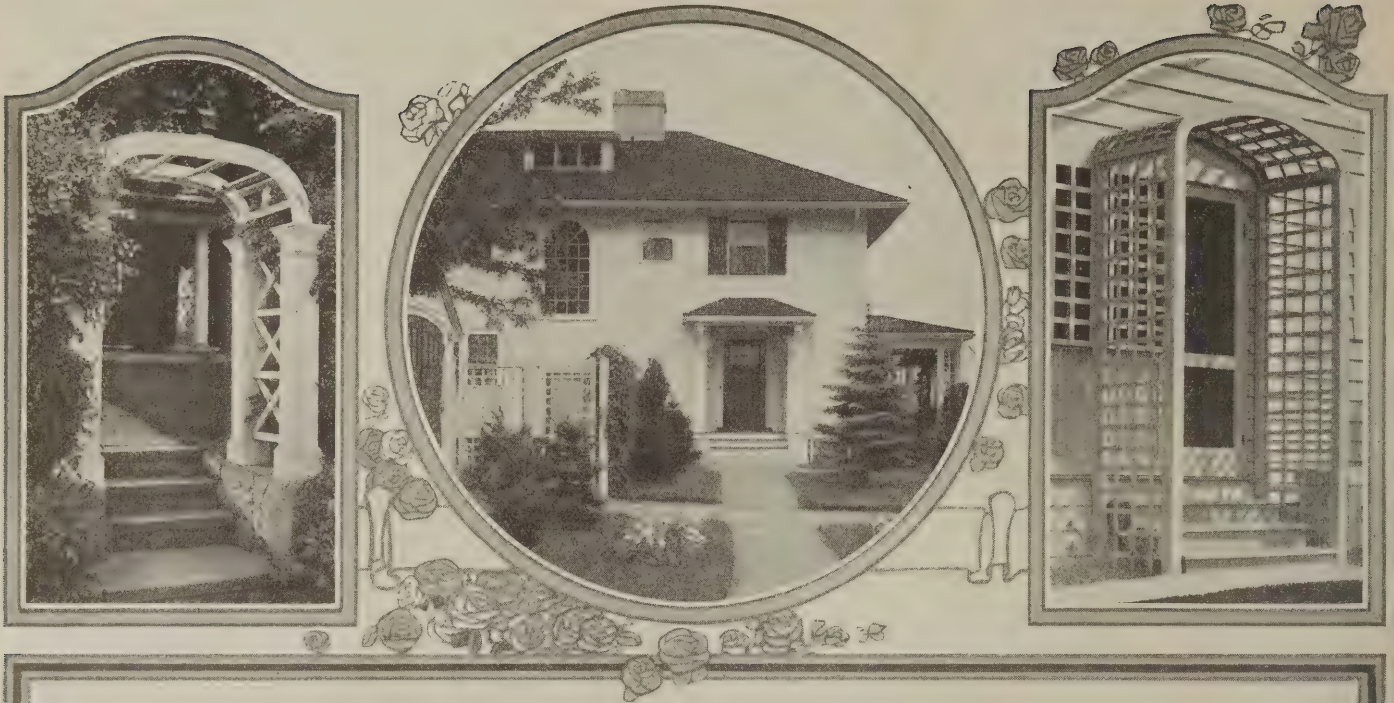
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THE MARK ON QUALITY LUMBER

It identifies lumber that long has borne a reputation for uniform high quality.

There are many **Long-Bell** trade-marked lumber products for the home builder. They are made of good virgin timber in strictly modern mills. Each

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Some **Long-Bell** Products

Sturdy, long leaf Southern Pine timbers, joists, rafters and studding.

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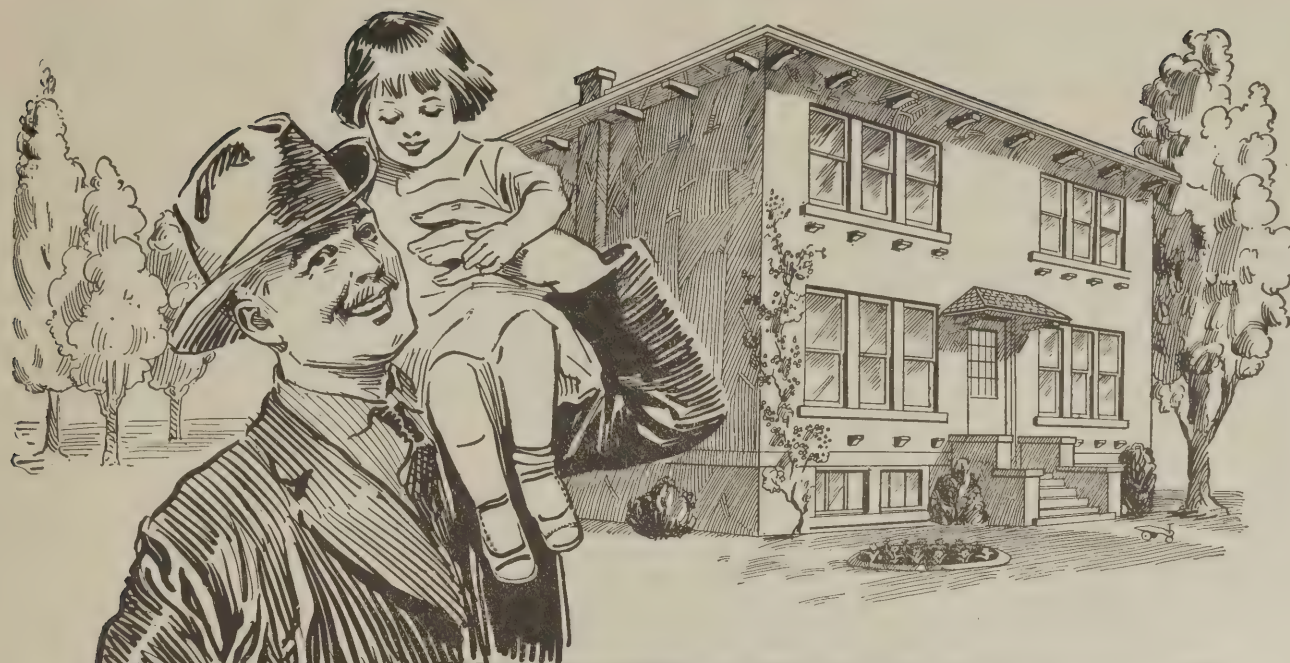
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The **Long-Bell** Lumber Company

R. A. LONG BUILDING

KANSAS CITY, MISSOURI

Manufacturer of Southern Pine, Hardwood, Oak Flooring; Creosoted Lumber, Ties, Posts, Poles, Piling and Wood Blocks



The "Ingersoll" Type of Concrete House

gets its name from the fact that it is the result of a great deal of study and work by Charles H. Ingersoll, of Ingersoll Watch fame, who for many years has been interested in perfecting a comfortable home of permanent type that can be erected at very low cost.

One group of these houses has been erected at Union, N. J.; another group is now being erected at Phillipsburg, N. J. These houses are of the poured-wall type and are remarkably well arranged.

The pouring process is completed in eight hours and the entire concrete job done under a week. It has been said of these houses that they represent manufacturing methods rather than building methods, and even today they are being erected at moderate figures.

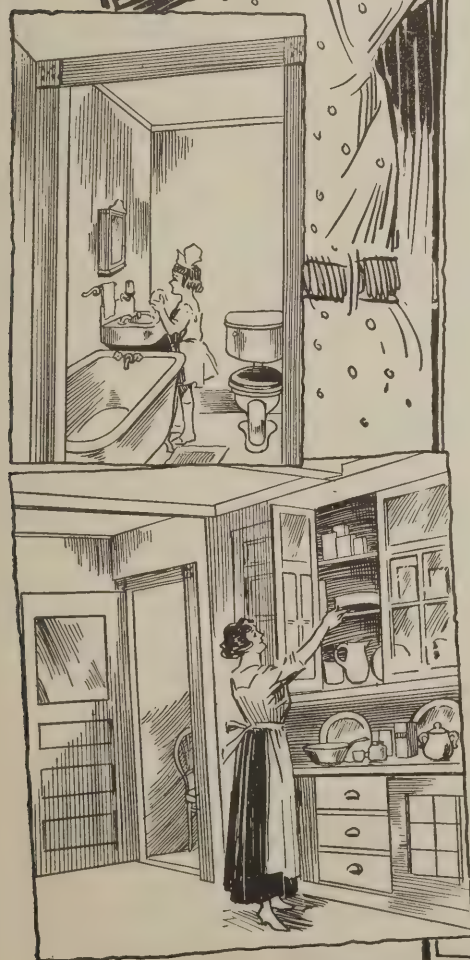
Issue No. 15 of ALPHA AIDS contains a description of these houses and a number of illustrations and working details. ALPHA AIDS is free on request, as are also the ALPHA Service Sheets on three different types of workingmen's homes: (1) Poured wall concrete houses; (2) Precast beam and slab concrete houses; (3) Gunite-and-frame houses.

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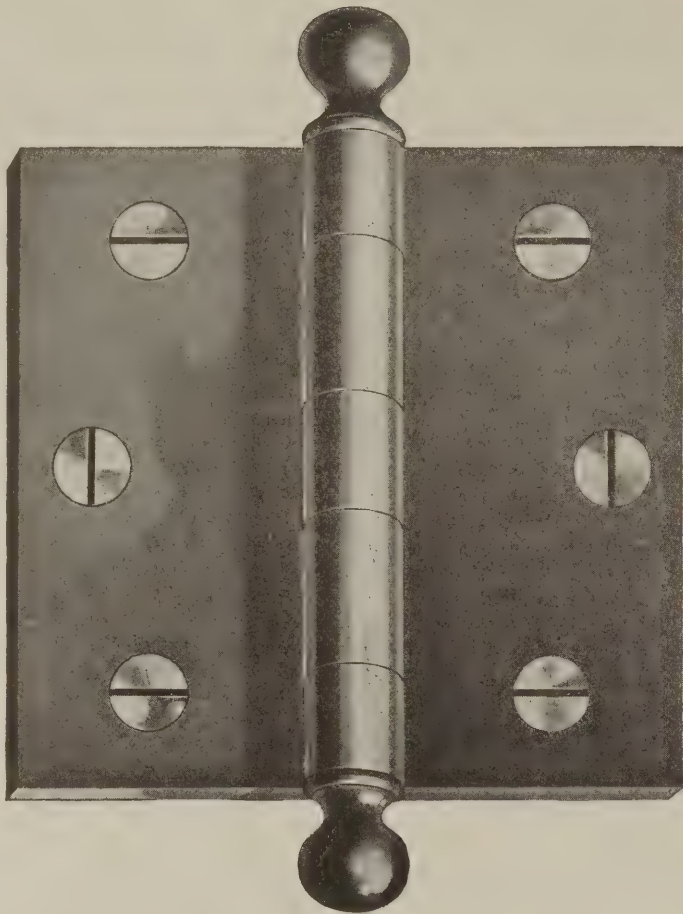
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Number 2714

The Quality Never Varies

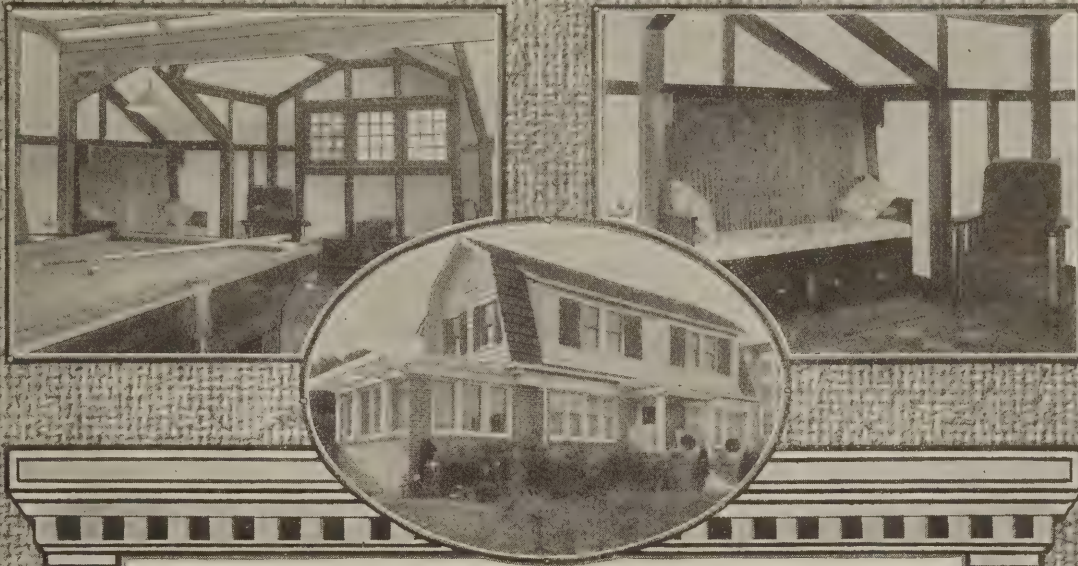
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Your hardware dealer undoubtedly stocks McKinney Butts and will gladly recommend them because he knows you'll never have occasion to complain. Insist on hinges and butts labeled McKINNEY—your dealer can get the size, finish or style you want in a day or two, as McKinney Butts are carried by all the leading jobbers.

Write now for a copy of booklet, "McKinney Butts for All Doors."

McKINNEY MANUFACTURING
Pittsburgh COMPANY *Pennsylvania*

For 50 years makers of good hinges and hardware



UNIVERSAL INSULITE

"The Wall Board Beautiful"

THE distinctive mat surface of Universal Insulite is of that charming craftsman type of beauty. It lends itself to an infinite variety of pleasing and artistic decorative effects. It can be tinted, stained or painted.

Saves Cost of Insulation

It **COMBINES** the most efficient, rigid form of insulation known with a beautiful wall lining—at the cost of a wall lining alone.

PREVENTS DAMPNES. Practically waterproof. Absorbs 96 per cent less moisture than ordinary wall board. It will not warp, shrink or crack. It does not deteriorate.

Made from long selected wood fibres only. Clean, odorless, vermin-proof. Comes in even, uniform sheets, 32 and 48 inches wide, 8 to 10 feet long— $\frac{1}{4}$ and $\frac{1}{2}$ inch in thickness. Handled and applied like lumber.

Building Material Dealers:

Aside from its use as a wall board, Universal Insulite has more uses than any other Insulating and Building Board on the market—Unexcelled as a Plaster Base and ideal for Magnesite Stucco—Extensively used as a sheathing—Adapted for cold storage work, incubators, bee hives, potato warehouses, etc., etc. It will pay you to know more about this unique building board, of which the United States Government used millions of feet in one year. It's the coming thing. Write us.

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"The Board of a

Thousand Uses"





Attractive interior of office of the Illinois Macaroni Company, Chicago, built by the Armitage Construction Co.

The Job—The Man and the Profitable Results

That "one good Beaver Board job brings others" has been amply proven by the remarkable success of the Armitage Construction Company of Chicago, Ill.

Big jobs or little jobs, the same thoughtful care has been exercised, and extraordinarily attractive offices, factory interiors, partitions and show windows have resulted. And always at a good profit to the builder.

Beaver Board business spells PROFITS in big letters—profits from each individual job and more profits through the repeat business that Beaver Board jobs bring.

Read the following booster letter from Mr. DeYoung, Pres., then decide to get some of the profitable Beaver Board business for yourself. Interesting literature on request.

THE BEAVER BOARD COMPANIES
178 Beaver Road Buffalo, N. Y.
 Branches at Boston, New York, Baltimore, Cleveland, Detroit, Chicago, Minneapolis, Kansas City, San Francisco, Ottawa, Can., and London, Eng.
 Manufacturers also of Beaver Greenboard and Beaver Blackboard.
 Distributors in principal cities dealers everywhere.

January 30, 1919

The Beaver Board Companies,
 Buffalo, N. Y.

Gentlemen: We aim to make every job a continuous endorsement of our company, knowing that it will bring additional work for us.

With this motto we have eliminated the use of everything but first grade materials and accordingly confine our efforts to sealite Beaver Board instead of so called wall board.

Beaver Board permits us to complete a job quickly, without any dirt or litter, at a minimum expense to our client and we find that it always produces the highest satisfaction.

Beaver Board work means additional profits for us and we promote its use at every possible opportunity.

Very truly yours,

THE ARMITAGE CONSTRUCTION COMPANY,
 (Signed) Anton DeYoung, President



ANTON DEYOUNG
 President Armitage Construction Company

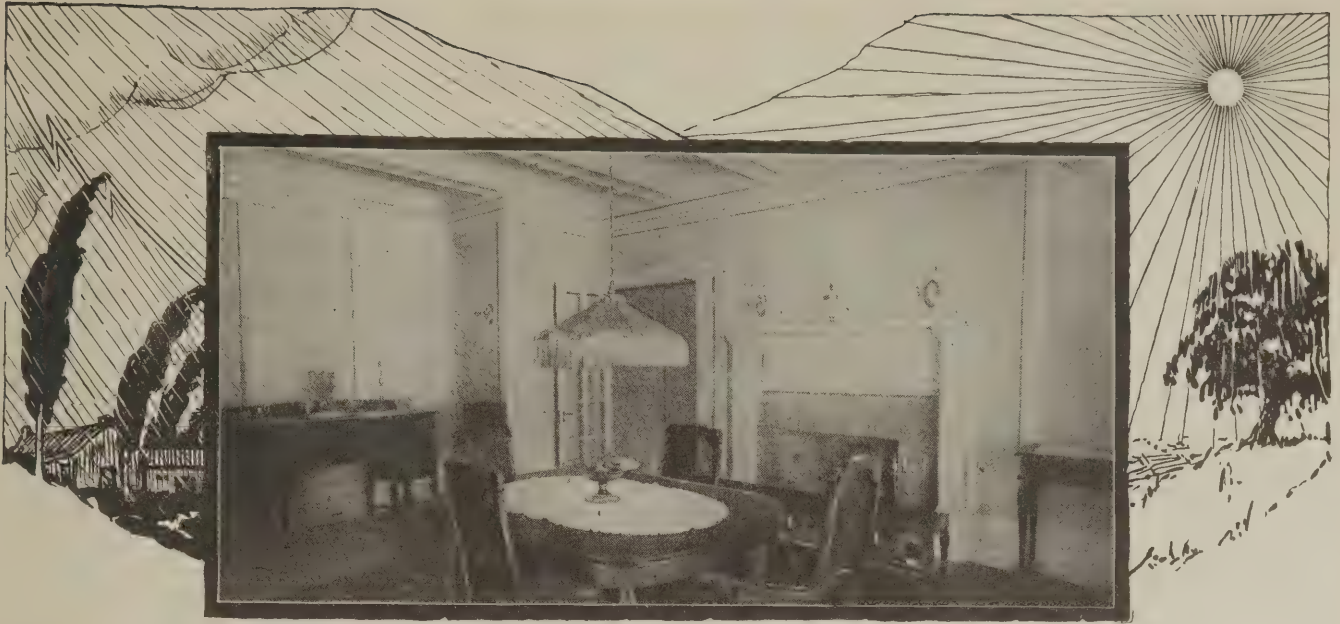


You can't expect Beaver Board results unless this trademark is on the back of the board you buy.

BEAVER BOARD

FOR BETTER WALLS & CEILINGS

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Put Up the Wallboard That Stays Put

Rain or shine, in hot climates or cold, Black Rock Wallboard keeps out the dampness, or the heat, and "stays put." Never falling, or cracking, once up it stays up, for Black Rock will last as long as the building.

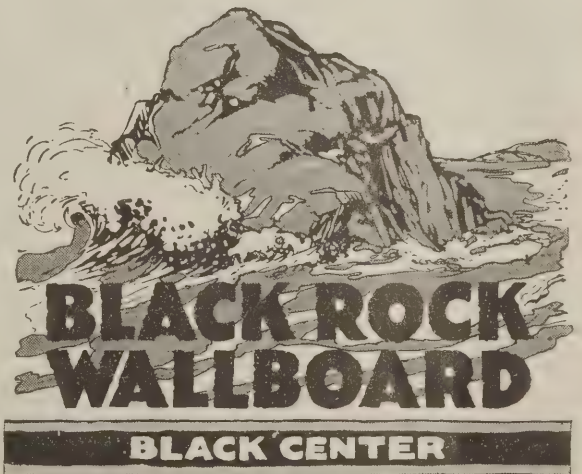
Black Rock Wallboard is built to meet differing weather conditions. Surface-sealed and sized on front and back, and further protected by its moisture-repellant black centre, this good wallboard has quality built right into it.

Black Rock Wallboard has many good jobs to its credit. Builders in many parts of the country have learned to depend on it. If you want real Black Rock results look up the Black Rock dealer in your vicinity.

Sample of Black Rock Wallboard cut from stock and details of our free Plan Service, sent on request.

THE BLACK ROCK WALLBOARD COMPANY
53 Ontario Street Buffalo, N. Y.

Dealers—Write for details of our exclusive sales plan.



BLACK ROCK WALLBOARD

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Minimum Investment—Greatest Return

THERE IS NO INVESTMENT so small that will yield as great a degree of comfort, healthfulness, convenience and beauty as the screened porch.

A SUN PORCH by day, a SLEEPING ROOM at night, it allows out-of-door living in the home, protected against disease-carrying flies and mosquitoes. SEND FOR OUR BLUE PRINT PORCH PLAN. It will help you show your prospects how. It is sent free.

THERE IS NO INVESTMENT in screen material that offers as great a return as PEARL Wire Cloth. Due to its metallic coating—a special process owned and controlled exclusively by us—PEARL is longest lasting, therefore costs less, besides being the most handsome, most sanitary, and needing no painting or repairs.

INSURE YOUR WORKMANSHIP by insisting upon the Genuine, which has two copper wires in the selvage and our red tag on every roll.

We have a dealer in your town. See him or write us if you are interested in permanently screening doors, windows or porches. Samples and literature FREE.

Address Department B.



The Gilbert & Bennett Mfg. Co.

New York

Georgetown, Conn.

Chicago

Kansas City

PEARL is made in two weights—regular and extra heavy
The best hardware dealer in your city sells "PEARL"



*"A living thing
Produced too slowly ever to decay." — Wordsworth*

THE natural romantic appeal of California Redwood should mean more and better business for you.

Even without the stimulus of our advertising, home lovers would sense the charm of this rose-tinted wood from the "big trees" of history. Soft (yet firm) of texture and free from pitch and resin, it permits of a variety of uses, both interior and exterior, which mark the Redwood-built home as distinctive—attractive—beautiful.

In our advertising through the leading magazines of the country we are fostering this appreciation. We are also explaining how the natural preservative which has protected the big trees for so many centuries, gives Redwood lumber remarkable lasting qualities today, and how its freedom from pitch gives it a remarkable resistance to fire.

By a simple statement of facts, we are stimulating the desire for this remarkable wood.

You will find that it pays you to fall in with this campaign. In money, because every pretty home built creates a desire for another. In reputation, because even the simple bungalow of Redwood has a "differentness" which advertises its builder.

Probably your lumber dealer can supply your California Redwood requirements. If not, give us his name.

Write for details and further information! Let us send you our free booklets: "California Redwood Homes," "How to Finish Redwood," "California Redwood for the Engineer," "California Redwood Block Paving" and "Specialty Uses of Redwood."

CALIFORNIA REDWOOD ASSOCIATION, 722 Exposition Building, San Francisco, Cal.

California Redwood
Resists rot and fire



Every Kellastone Structure Creates a Sale for Another

Today many a Building Contractor is multiplying his profits by specializing on KELLASTONE. A single job has proven the means of creating big business—homes, apartment buildings, hospitals, schools, churches, etc.

A KELLASTONE structure is truly an inspiration to the prospective builder—a source of everlasting satisfaction to the owner and a matter of civic pride to the entire community.

KELLASTONE

IMPERISHABLE STUCCO

Is the original magnesite stucco—as lasting as the pyramids—does not expand, contract, chip or crack like ordinary stucco. It's a scientifically balanced composition that does not contain a particle of gypsum, lime or portland cement.

KELLASTONE qualifies for cottage or mansion, affording exclusive talking points which instantly appeal to every particular builder. Meet us half way and we will unfold the details of a proposition that will enable you to cash in on the approaching wave of prosperity in the building world.

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AND you can't blame him. At ten feet they look alike—look black or gray—wrapped in paper-bound rolls. This is your cue to forget that you are selling roofing by the sheet and to start to sell fire safety and wearing economy.

Tell your customer what Johns-Manville Asbestos Roofing is made of—that it is actually a rock-felt that turns fire like a granite brick turns an axe edge. Tell him that its binder is real honest-to-goodness asphalt, and that natural asphalt will not carry fire.

Then prove it all to him by directing the flame of a blow-torch against a sheet. A little of the binder will melt, but the asbestos base will be unaffected. Then test other roofings the same way and see what happens.

Sell safety at a fair price. That's merchandising—and good advice to the buyer; he'll see it every time.

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10 Factories—Branches in 63 Large Cities

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*Interior of STAR Equipped Barn
on Wheatfield Farms,
Tonawanda, N. Y.*

Recommend "Everything for the Barn" From the Complete STAR Line

YOU can equip your customer's barn with not only STAR Stalls and Stanchions but Water Bowls, Steel Pens, Litter and Feed Carriers, Hay Tools, Door Hangers, Cupolas and everything else in steel equipment from floor to roof top. You can give him the advantage of being able to get all his equipment from one place, and have the same high standard throughout.

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It's easier to install STAR Equipment. With the STAR Unit System you can put in one stall or a hundred to exactly fit your customer's need. He can always add other STAR Stalls as he needs them.

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Hunt, Helm, Ferris & Co.
Complete Barn Outfitters
Harvard, Ill. Albany, N. Y.

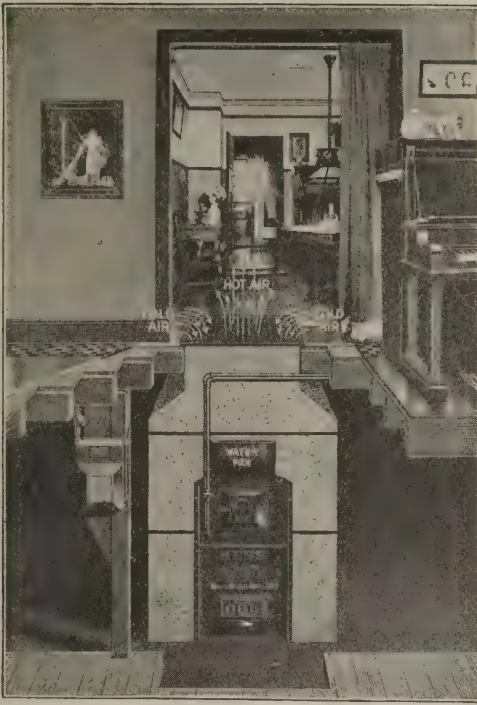
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The Hess Pipeless Furnace—One Register Only, for Hot and Cold Air

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NEVER LEAKS, for all seams are welded and never open from expansion or contraction. The inside is smooth; no flues nor smoke passages to clog and prevent radiation.

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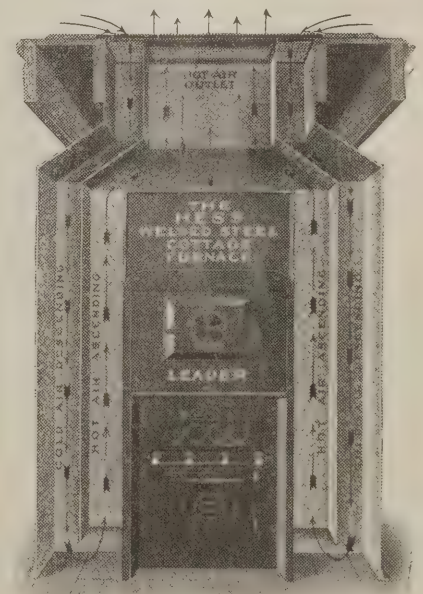
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Right now, the dull season, is the best time to buy. Lower prices, later, seem improbable, but if we should reduce our rates before October, we guarantee to refund, to all early buyers, an amount equal to any reduction we may make. Therefore, you are guaranteed the season's lowest prices on your early purchases.

Terms: Cash, Liberty Bonds or easy monthly payments. Send us a sketch of your house, for our estimate and our plan, showing the size and location of every detail required.

Our 48-page book on furnace heating is free. Let us send you one, and let us tell you, also, **how to burn soft coal and get FLAME and HEAT**, instead of SMOKE and SOOT.

Special rates to contractors, for resale. We sell to very many contractors, everywhere, and their repeated orders, year after year, are the best evidence of the success of our heater, and our direct-selling policy.



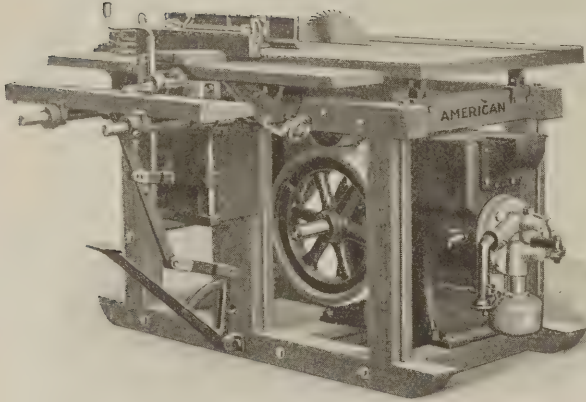
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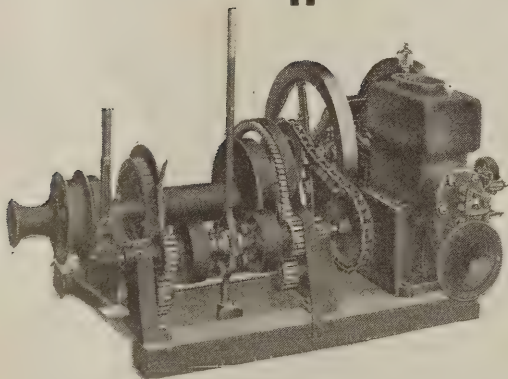
Put these on your pay roll



"American" Variety Woodworker with Gasoline Engine Built in. Also supplied with Self-Contained Electric Motor, or arranged for Belt Drive

Here are two "Americans" ready to work for you, about whose reliability, speed and sense of responsibility there can be no question. They served Uncle Sam faithfully during the war — and now the same loyal service is at your disposal. They helped make unprecedented building records in war time. And they will bring the same "pep" into peace time work for you.

"American" Cost Cutters



"American" No. 4 Hoist with Self-Contained Gasoline Engine. It can be made also with Electric Motor Built in, or arranged for Belt Drive

The "American" Variety Woodworker will give you a planing mill right on each job—capable of turning out all ordinary classes of finished work that you will need. It's a 4-man, 18-in-1 machine with almost unlimited capacity for time-and-labor-saving. The "American" Contractor's Hoist is as good as a gang of men, for the lifting and hauling. Bulletin 67 tells about the woodworker—Bulletin 10 about the hoist. Write for them—and ask also for the book, "How Americans Helped Win the War."

American Saw Mill Machinery Co.

1361 Hudson Terminal

New York City

4 and 7 cu. ft. capacities; may be equipped with low charging platform, power loader or batch hopper, automatic water measuring tank and light duty hoist.



Send back the coupon and get the facts of this **BIG VALUE**

The mixer value extraordinary! You, too, would say so if you could closely examine its construction and see how scientific design gives strength without weight. If you were to guess the price, you would guess way high because the price is extraordinarily low for a mixer of this durable construction and fast action. Not the cheapest mixer but a light, reliable mixer at a surprising price—a value extraordinary.

Built in big quantities—that is what brings the price down without cutting down quality.

Every part standardized. No manufacturing machinery to be paid for out of the selling price, because the Dandie Light Mixer is made by the largest makers of heavy duty mixers in America.

Dandie Mixers have a mixing action that meets the approval of strict engineers—all steel construction, double gear drum drive—a smooth rolling drum action that minimizes vibration and insures long life to every part of the mixer. Liberal power with engine enclosed in dust-proof steel housing.

Send back the coupon for Catalog S-5 and do it now if there is any chance that you will need a mixer this season. Stocks carried in several warehouses throughout the United States.

Koehring Machine Co., Milwaukee, Wis.

Koehring Machine Co.,
Milwaukee, Wis.

Please send me Catalog S-5 giving full details of Dandie Mixers. This obligates me in no way.

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THE BUILDER

His Vision and His Purpose

*Drawn for National Builder
by John T. Nolf*

NOLF

National Builder

Number 3

Chicago, March, 1919

Vol. 62

HIGH PRICES are holding building activity back, notwithstanding a rapidly increasing and enormous demand.

* * *

The Redfield Commission (U. S. Government) is investigating material prices. If these are not found justifiable the government may be compelled to establish or fix them. This will be the last extremity.

* * *

Meantime the agents of the U. S. Department of Labor are in the field conferring with all building interests and clearing the way to better understanding by the presentation of facts, and government plans.

* * *

Frank J. Pollay, special agent of the Bureau of Information, says delay is due to lack of confidence and to builders and material men not getting together. Cooperation must be obtained all around. On one project, that of a \$300,000 school house, by getting all interested together in this way to revise the first bids, the price was reduced from the first estimate \$60,000.

* * *

William B. King, general counsel of the National Association of Builders Exchanges, speaking to the Philadelphia Builders' Exchange, says that a jarring note comes in reports from some sections that bankers decline to make loans for building improvements because they feel that their resources must be conserved for the coming Liberty Loans. Mr. King is of the opinion that these ideas come from some irresponsible employees of the Treasury department who do not realize the war is over. The Secretary of the Treasury will be asked to investigate these reports.

* * *

"A difficult obstacle to building resumption," said Mr. King "is the feeling among investors that war prices must shortly come down. But these investors must be convinced that prices will not be lower for six months or a year, and there is a great demand for building in spite of high prices."

* * *

Roger Babson, the statistician, estimates the possible reduction in prices at 20 per cent six months or a year from now. That is, as compared with present conditions. It is a question of measuring money value with building value. Money interest is low now. Money put into buildings which will rent easily or sell easily yield a larger interest. Land values are increasing. The taxes and the capital locked up without interest in unused building sites must continue to eat into any saving in lower costs of building at a later period.

* * *

T. F. Breen, of Fort Dodge, Iowa, points out that the words "high prices" as popularly used and applied to building give a false impression. Building material taken in connection with prices of everything else is cheaper now than it will be. The volume of paper money based on our enormous gold

reserve and in the form of Federal Reserve bank certificates has been greatly increased. Also, when the government issued \$13,000,000,000 of bonds it practically increased the circulating medium of exchange just that amount, since government bonds are easily exchangeable into money. This expansion of currency must be reflected in the higher cost of everything that is measured by money. Thus a bushel of oats at 50 cents, in view of the enormous expansion of the currency and consequent lessening of the purchasing power of the dollar, is no higher now than before the war when it sold for 25 cents a bushel. High wages will continue with high cost of living, plus the limitation of hours of labor and the impending international eight-hour day, though both material and labor will be affected on these higher levels by the usual fluctuations of supply and demand.

* * *

The price of some building material may be somewhat below normal this year. For instance, the iron and copper mills have been busy for the past four years in the manufacture of war materials. The war having ceased the price of iron, steel and copper is apt to be below normal during the readjustment period.

* * *

A New York broker, dealing in building values for many years, says that delay in building, owing to high prices, will be overcome when **improved property values increase** to such an extent that it will be possible for a speculative builder to erect a house and get out with a little profit.

* * *

In 1916 the cost of excavating a square yard of earth was 55 cents. Today the same contractor wants \$2.00. Rock could be lifted in 1916 for \$1.75 to \$2.00 a square yard. Today its cost is \$5.25. This is only one item, but typical of the rest, and seeming to make building very high.

* * *

But property values are increasing so rapidly that it will be only a few months before owners will be getting a price which will make building profitable.

* * *

Meantime money, material and labor and sympathetic cooperation are at the service of the present-hour builder. What fluctuation in prices in the future may seem to impair the value of the present-hour building must be measured against time—the use and profit of the building, and the increase in property values generally.

* * *

As has been pointed out, measuring values by our inflated currency throws the mind back to pre-war conditions—which is a misleading way of approaching an estimate of building values. Building costs now are cheap when considered on the basis of exchange values—as against other articles or material—and this in the front of an unprecedented demand, and increasing rents.

The Crisis in Speculative Building

By C. Stanley Taylor

Project Engineer, Mann & MacNeille, New York

AT this time when we enter the period of reconstruction all business is in a state of flux. New methods and new commercial policies are crystallizing. The war period marks the closing of a clearly defined chapter in the history of industry and commerce. This, then, is a time for reflection and careful analysis of the past, in order that activities of the future may be guided not only by copying past success but by avoiding past mistakes.

There can be no question that the war has broadened the viewpoint of every business man. We have risen as never before in history to meet its demands on national finance and production. It has been a war of industry and commerce finding its expression in physical conflict; but depending for its final result upon the creation and application of great economic forces.

Today, throughout the professions and trades which make up the building industry of the United States, preparations are being made to meet a demand for new buildings greater than ever before known. A million homes are needed in America. Public buildings of every kind, apartment houses, factories, office buildings, water and railroad terminal facilities are in demand—in fact from every section of the country there is a call for space to house commercial and industrial activities.

Activity in the Construction of Homes

In the architectural and building professions we therefore look forward to busy years of prosperity and find that probably the greatest single factor of building activity will be in the construction of homes.

Homes of every type are needed everywhere, but particularly those costing from \$3,000 to \$10,000, to house our industrial classes and those whose earning capacity is of modest proportions.

The speculative builder is today looking forward to a share in the returns of the coming period of activity and he will no doubt profit considerably. If he will pause, however, as others are doing, to analyze the national indications bearing upon the activities of his profession he may benefit enormously and so regulate his future activities that his share in the profits of building activity may be greater and more lasting than ever before.

At the Fork in the Road

The speculative builder today has reached a fork in the road. He may proceed as in the past, building usually cheap and poorly designed structures, having in view only the immediate dollar, or he may strike out on the higher and more difficult road, but the one at the end of which lie greater profits and a greater stability of his profession.

To indicate clearly what is meant by the foregoing statement, let us consider a few national issues and conditions of the public mind which bear importantly upon the future success of speculative building.

The first thought which comes to mind is that of "industrial housing." How many speculative builders have stopped to analyze the reason for the interest of manufacturers and civic authorities which causes them to give time and money in an effort to build homes for factory employees.

Rent is 20 Per Cent of Earnings

A workman usually spends in the purchase or renting of a home at least 20 per cent of his earnings. With the exception of a few housing projects this money is paid to the speculative builder, either directly or to the landlord who purchased from the builder.

To the manufacturer and the constructive social worker there are two facts, which, combined, have led to a determination that they must take in hand what should be the work of the speculative builder. These follows:

1. That 20 per cent of our national annual payroll has been paid to the speculative builder.
2. That our workmen are generally housed in slums, poorly constructed and unattractive houses or in cheaply built homes which depreciate rapidly in value.

That is why other interests than the speculative builder are entering what should be his legitimate field, and building thousands of houses, distributing to other sources profits which might have been his! The interest in industrial housing is growing. It should be sig-



nificant that if the workman could get a decent, fairly attractive home for reasonable payment the manufacturer would not spend one minute or one dollar in this field. Realize this!

It is evidently "up to" the speculative builder. Plainly he has not used wisely the part of the national payroll entrusted to him.

In financial circles we find a reaction to these conditions. The speculative builder is finding it more and more difficult to get money even in normal times. He has to finance more heavily himself. His credit is curtailed and money costs him more.

In the general business world the term "speculative builder" is usually tinged with a belittling and distrustful intonation. It connotes cheapness and in a sense trickiness. It seems to carry inherently a "watch your step" sign.

What is the reason for this condition and how can it be remedied?

Speculative building is a sound, honest and profitable business undertaking. It consists of buying wisely selected land, improving it with saleable houses and selling as quickly as possible at a reasonable profit. There is no reason why all the modest homes of America should not be built on this basis if the builder will but study his business and the interests of the buying public.

The Value of Good Design

One point in which American builders have failed in their public trust, and one easily remedied, lies in the question of design—both from utilitarian and aesthetic viewpoints. There is no real excuse for the ugly and unattractive houses which may be found by thousands in our American communities. They have been built by speculative builders, they are a burden on realty values, and they do not encourage the interest of tenants to keep them in attractive condition. These

are potential slums—and for our slums we blame the speculative builder to a great extent.

It must not be understood that this is an argument for the employment of an architect on each moderate cost house. It is not, nor should the overhead cost of production be burdened by architects' fees! The man who has for years carefully saved from his hard earnings to buy a home, or who cheerfully pays rent for the housing of his family should not be asked to pay for architectural services. There are other means at the disposal of the builder whereby he may get a well designed house at little if any additional cost.

Get Plans

For instance, through various building publications well considered plans may be obtained. A speculative builder may build from stock plans, which should be original designs by a good architect, but which may be built over and over again with slight variations in exterior and placement.

Planting

Planting, which under the dignified classification of landscape architecture is highly paid for in more expensive houses, may be made of value to the modest house. A small investment in well planned trees, shrubs and vines may add a considerable profit for the speculative builders. It certainly adds to the selling quality of the house and to the character of the neighborhood.

Time and space call us back to our serious subject. The two roads which the speculative builder faces are, first, the old road of cheap, poorly designed building which has been condemned by public sentiment. The second is the new road of service through which better communities of more efficiently designed homes may arise in coming years to the credit of the speculative builder.



Number 1—Types of California Bungalows—See Page 25



A TWO-STORY STUCCO BUNGALOW

R. A. Phillips, Architect

This attractive residence is the subject of the working plans which form the Supplement to this issue of NATIONAL BUILDER. The quantities have been drawn off by Frank R. Walker and his original figures reproduced as an authoritative estimating basis

A Two-Story Bungalow

With Quantity Survey by Frank R. Walker

WHEN you are handed your change in making a purchase you usually count it, Mr. Builder, but when your money is represented in building material you are inclined to do the very reverse and take a guess at it—"lump it"—in other words.

The two-story bungalow which is here illustrated, with the working plans which form the Supplement, and the quantity survey which is given on the following pages you can make the means of saving you many a mistake and many a dollar. These form not only a basis for estimating a bungalow such as is represented but a set of practice sheets for you to develop and instruct yourself in taking off quantities correctly.

The reproductions of the quantities may not give you enough space in the columns for your extensions to put in the costs of materials and labor. Besides you may make some mistakes and spoil the sheets. But take a few ruled sheets and put in your costs and see how you come out.

By filing these surveys and your estimates you will collect a lot of valuable data which will serve you in good style as time goes on.

The forehanded man is the man who is ready for every emergency. If there are any points in this survey that you do not understand, remember that we are here to help you, and all you have to do is to write and tell us what you do not understand and your questions

will be answered in the next number of NATIONAL BUILDER.

Added to this and running down the side of the survey charts is an article about California bungalows by Leila Ross Wilburn. These, beyond the fact that they are bungalows, have nothing to do with the survey or the bungalow to which the survey relates. These are merely to show various types of bungalows. Their floor plans can be worked out in various ways. The construction as touched on by Architect Wilburn will suggest all sorts of modifications to the enterprising and progressive builder.

In future issues will be shown bungalows and all descriptions of buildings and construction coming within the line of work that the individual contractor undertakes.

Remember that you are in business to make money. Material and labor cost money, and upon your ability to estimate and make a just bid depends whether you win or lose.

The building associations are working hard to put building on a higher plane, and eventually do away with lien laws and surety bonds. The only way that can be done is by every man getting himself in such shape that he can stand on his own feet as a business man and a builder.

So we are striving to help you in your own interest, in your patriotic duty and in your loyalty to the Building Arts.

The reason many builders go broke is in the office and not on the job.

TYPES OF CALIFORNIA BUNGALOWS

By Leila Ross Wilburn

Before going out West my idea of the houses had been gathered from various plan books and architectural magazines. Seeing the separate houses in photographs in no way prepared me for the effect of whole sections of nothing but new, snappy, up-to-date houses and well-kept lawns. I do not suppose that there is any other section of the country where such attention has been given to increasing the value of real estate by developing subdivisions.

At first I was more impressed by the way the residential property was laid off than by the houses themselves. The idea I particularly liked was in having the streets run in one direction with cars about every second street. They were crossed at right angles by the avenues on which the houses faced. This left every house within a block of the car and also kept most of the houses away from the noise of the street cars. As oil is plentiful in California, the streets are kept well oiled and so there was very little dust to annoy one. All of the avenues had a parking strip at the edge of the sidewalk and the tall palm and pepper trees planted in this strip made the avenues shady. Another attraction was the absence of all telephone and



Number 2—Types of California Bungalows

PRACTICAL		Form 114		GENERAL ESTIMATE		ESTIMATE NO. 2		SHEET NO. 1	
BUILDING		BUNGALOW		ARCHITECTS		NATIONAL BUILDER		CHECKER	
LOCATION		NATIONAL BUILDER		SUBJECT		GENERAL		DATE	
ESTIMATOR		E. J. J. J.		CHECKER		M. W.		DATE	
2-17-19									
EXCAVATION	Assumed from Grade								
General	34'-0" 30'-0" 6'-1"		6205						
Trenches	9'-8" 15'-0" 6'-3"		906	7111					
	33'-0" 0'-5" 1'-8"		416						
	25'-8" 0'-5" 1'-8"		36						
	6'-0" 3'-3" 2'-6"		98						
	3'-3" 2'-0" 3'-6"		23						
	14'-8" 2'-0" 3'-6"		100						
	13'-9" 2'-0" 3'-6"		96						
Col. Footings	1'-0" 0'-5" 1'-0"		3						
Chimney	2'-0" 2'-4" 1'-0"		5	407					
BACKFILL	34'-0" 6'-3" 1'-0"		425						
	28'-0" 6'-3" 1'-0"		350						
	9'-8" 6'-3" 1'-0"		121						
	6'-0" 3'-3" 1'-0"		39						
	3'-3" 3'-6" 1'-6"		17						
	14'-4" 3'-6" 1'-6"		75						
	13'-9" 3'-6" 1'-6"		72	1099					
CONCRETE FOUNDATIONS	1'-3" 1'-5" Concrete								
Wall Ftgs	33'-0" 0'-6" 1'-8"		55						
	27'-0" 0'-6" 1'-8"		45						
Fdn Ws	32'-0" 5'-10" 0'-8"		124	373					
	32'-0" 6'-4" 0'-8"		135	405					
	26'-8" 6'-0" 0'-8"		213	640					
Cistern Ws	9'-0" 6'-3" 0'-8"		75	225					
	13'-0" 6'-3" 0'-8"		54	163					
Front Step Fed	6'-0" 3'-3" 1'-6"		58	78					
Rear	4'-0" 3'-6" 0'-6"		7	28					
	12'-0" 3'-6" 0'-6"		22	90	Sq. Ft. Forms				
	14'-3" 3'-6" 0'-6"		25	100	2102				
Col. Ftgs	1'-0" 0'-6" 1'-0"		4						
Chimney	2'-4" 1'-0" 2'-0"		5						
			822						
CONCRETE FLOORS	3/4" Rgn Conc. 1/2" Corn Fin Top								
Brnt	30'-8" 26'-8"		818						
	9'-0" 11'-8"		105	923					
WATERPROOFING CISTERN	Asphaltum Paint								
	9'-0" 6'-0"		108						
	11'-8" 6'-0"		140						
	9'-0" 11'-8"		105	353					
CEMENT BLOCKS	(8"x8"x16")								
	32'-0" 2'-0"		128						
	26'-8" 2'-0"		107	235					
CHIMNEY									
Common Brick	32'-0" 4'-8" 0'-4"		149 x 6						
Flue Tile	32'-0" 1/2" 8"x12"		32						
Clean-out Door	12"x12"		1						
Flue Thimbles	3 6" Dia		3						
ROUGH CARPENTRY									
FRAMING Posts	6"x6" 8'-0"		168						
Caps	2"x6" 2'-0"		8						
	2"x6" 1'-0"		3						
Girders	2"x10" 18'-0"		120						
	2"x4" 18'-0"		24						
	2"x10" 14'-0"		93						
	2"x4" 14'-0"		14						
	2"x10" 16'-0"		106						
	2"x4" 16'-0"		21						
	2"x10" 14'-0"		93						
	2"x4" 14'-0"		14	506	506				
Joists 1st Fl.	2"x10" 12'-0"		480						
	2"x10" 12'-0"		220						
	2"x10" 9'-0"		330						
Porch	2"x16" 10'-0"		110						
Side Ent.	2"x10" 12'-0"		80						
	2"x10" 4'-0"		44						
	2"x6" 7'-0"		28						

Quantity Survey Sheet No. 1

electric light wires; these were in the alleys at the rear of the lots.

The Western architects have borrowed ideas from nearly every country. One of the oldest houses I saw was in Los Angeles and is a modification of Japanese architecture. Then other houses having very broad overhanging eaves, heavy timber brackets and unusual balconies



Number 3

remind one of the Swiss chalet. The flat roof and patio of the mission school and the tile roof and arches of the Spanish home are everywhere in evidence. In a few houses are shown the influence of our own Colonial homes, though the two-story column is seldom seen. The English half-timber style has been copied freely and very successfully.

Every house is, to a certain extent, like every other house; it must have walls, a roof, and about the same number of doors and windows. Every house must be constructed of such materials as are in common use; it must be built to withstand the various kinds of weather. The conditions for building and the materials



Number 4

at hand are not so very different here and in California and yet what a difference in the effect of the houses. With the exception of the boulders for masonry work and the plants, there is no reason why a California house could not be duplicated here and look as well here as there.

On the west coast materials are combined in such a way as to give no monotonous surfaces at any time. By the photos it will be seen that the plain surface of the stucco foundation in No. 4 is varied by having caps of brick; in

No. 5 all brick are used, but clinkers are used freely so as to keep from having plain, stiff surfaces. In No. 8 the plain brick work is relieved by the porch arches and the hood over the front door. In most of the bungalows very little of the foundation work shows, the material of the side walls being carried down to the ground as in No. 2. Some very good effects are obtained by the use of stained trim and timbers against the light stucco and boulder masonry. In one house I remember seeing the stucco work protected by having wood angle strips at all corners. The contrast was good and the strips performed the double duty of being ornamental and protecting the stucco work. Sometimes the light and dark effect was produced by having heavy stained timbers for rails and at the columns and pedestals allowing the dark timbers to project through the masonry work.

Where wood is used for columns it is most likely to be solid wood, alone or in clusters, and short and massive looking. When wood balusters are used they are simple and heavy. In design No. 2 the columns, as well as the chimney, are of brick at the top, then dark rough stone and at the base the large massive white boulders. The stones are so arranged and spread out at the bottom as to make the masonry work look as if it grew out of the ground. Although both flat and hip roofs are used in California, it will be noticed that most roofs have from two to a dozen gables. Every house shown in the accompanying illustrations has one or more gables, yet the roofs are in no two cases even similar. The most popular covering for inexpensive bungalows, particularly those of low pitch, is the sheet asbestos. This covering is seen used plain in No. 9 and with battens every few feet in No. 2. The battens are attractive at the ridges and also throw a shadow on the roof, which is needed where the roof is so white. The unbroken white surface is



Number 5

also relieved in the first house in No. 1, where alternate widths of shingles and sheet asbestos were used. For the more expensive house tile is often used and at times the effect of tile is obtained by

NATIONAL BUILDER										ESTIMATE No. <u>2</u>	
Form 114										SHEET No. <u>2</u>	
BUILDING <u>BUNGALOW</u>										ESTIMATOR <u>E. Z.</u>	
LOCATION										CHECKER <u>M. W.</u>	
ARCHITECTS <u>NATIONAL BUILDER</u>										DATE	
SUBJECT <u>GENERAL</u>										DATE	
COPYRIGHT BY FRANK & MALTBY PUBLISHER CHICAGO											
DESCRIPTION OF WORK	NO. PIECES	DIMENSIONS		EXTENSIONS	EXTENSIONS	TOTAL ESTIMATED QUANTITY	UNIT PRICE MTL	TOTAL ESTIMATED MATERIAL COST	UNIT PRICE LABOR	TOTAL ESTIMATED LABOR COST	
ROUGH CARPENTRY, CONTD											
Joists 2nd Fl.	24	2" x 8"	14'-0"	447							
	13	2" x 8"	14'-0"	243							
	7	2" x 8"	16'-0"	149							
	6	2" x 8"	20'-0"	160							
2nd Sty Ceiling	9	2" x 4"	14'-0"	84							
	16	2" x 4"	12'-0"	128							
	6	2" x 4"	10'-0"	40							
	13	2" x 4"	8'-0"	69							
Porch Clg	7	2" x 6"	10'-0"	70							
Side Ent	4	2" x 6"	14'-0"	56							
	6	2" x 6"	4'-0"	24							
Back Ceiling Furring	7	2" x 4"	6'-0"	28	2793	2793					
Bridging 1st	132	1" x 2"	16' o.c.	132							
	124	1" x 2"	16' o.c.	124	256	256					
ROOF FRAMING											
Rafter Rear	18	2" x 4"	20'-0"	240							
Front	16	2" x 4"	20'-0"	216							
Under Dormers	10	2" x 4"	4'-0"	27							
"	17	2" x 4"	16'-0"	181							
Front Ent	8	2" x 4"	7'-0"	37							
Ridge	1	1" x 6"	4'-0"	2	720	720					
EXTERIOR WALL STUDDING											
Sills	8	2" x 10"	16'-0"	213							
	8	2" x 10"	14'-0"	187							
	4	2" x 10"	10'-0"	67							
	2	2" x 10"	12'-0"	40							
	2	2" x 10"	5'-0"	17							
	2	2" x 10"	12'-0"	40							
	2	2" x 10"	14'-0"	47							
	4	2" x 10"	7'-0"	47	658	658					
Blocking Sills	200	2" x 4"	1'-0"	133							
Plates	416'-0"	1/2" x 4"		277							
Ribbons	100'-0"	1" x 4"		33							
Porch Girders	4	2" x 6"	8'-0"	32							
	2	2" x 6"	12'-0"	24	56	56					
Studs	50	2" x 4"	12'-0"	400							
	26	2" x 4"	18'-0"	312							
	14	2" x 4"	12'-0"	131							
	12	2" x 4"	16'-0"	127							
	12	2" x 4"	18'-0"	144							
	6	2" x 4"	20'-0"	80							
Porch	29	2" x 4"	5'-0"	97							
" Posts	16	2" x 4"	12'-0"	128							
Front Ent	18	2" x 4"	5'-0"	60							
	14	2" x 4"	2'-0"	19							
	4	2" x 6"	5'-0"	20							
Side Ent	21	2" x 4"	10'-0"	140							
	5	2" x 4"	12'-0"	40	1698	1698					
INTERIOR STUCCO & DORMERS											
1st Fl. Plates	18	2" x 4"	16'-0"	192							
	2	2" x 6"	8'-0"	24							
Studs	100	2" x 4"	9'-0"	600							
	7	2" x 6"	9'-0"	63							
2nd Dormer Wall Plates	9	2" x 4"	18'-0"	108							
Studs	51	2" x 4"	10'-0"	340							
" Part. Pl.	16	2" x 4"	16'-0"	192							
Studs	91	2" x 4"	8'-0"	435	2004	2004					
EXTERIOR WALL SHEATHING 1" x 6" D.M. X.F.											
Main Bldg	2	28'-0"	16'-0"	896							
	2	32'-0"	12'-0"	768							
Dormers	4	2'-0"	15'-6"	124							
		4'-0"	4'-0"	16							
		13'-0"	1'-6"	20							
		2'-0"	4'-0"	8							
		8'-0"	1'-6"	12							

Form 114									
BUILDING <u>BUNGALOW</u>									
LOCATION <u>NATIONAL BUILDER</u>									
ARCHITECTS <u>NATIONAL BUILDER</u>									
SUBJECT _____									
ESTIMATE No. <u>2</u>									
SHEET No. <u>2</u>									
ESTIMATOR <u>E.T.</u>									
CHECKER <u>M.V.</u>									
DATE _____									
COPYRIGHT BY FRANK WALKER PUBLISHER CHICAGO									
DESCRIPTION OF WORK	NO. PIECES	DIMENSIONS	EXTENSIONS	EXTENSIONS	TOTAL ESTIMATED QUANTITY	UNIT PRICE M.T.L.	TOTAL ESTIMATED MATERIAL COST	UNIT PRICE LABOR	TOTAL ESTIMATED LABOR COST
EXTERIOR WALL SHEATHING - CONTD									
Side Ent		36'0" 11'6"			1414				
		3'0" 9'0"			27				
Front Ent	4	3'0" 2'6"			80				
	2	5'6" 2'0"			22				
	2	1'3" 4'6"			11				
	2	2'3" 2'0"			9				
	2	3'0" 5'6"			33				
Porch		34'0" 4'6"			153				
	2	5'4" 6'6"			69				
	2	3'0" 6'6"			89		2650 + 20% 3181		
ROOF SHEATHING 1"X6" Y.P. SHIP LAP									
Main Rf		55'0" 19'0"			1045				
		29'0" 15'0"			435				
		21'0" 3'0"			63				
Front Ent		8'6" 6'3"			53		1586 + 20% 1915		
ROOF SHEATHING 1"X6" T+G Y.P.									
Porch		9'0" 12'3"			110				
Side Ent		4'0" 12'0"			48				
		3'6" 9'0"			32		190 + 20% 228		
ROUGH FLOORING 1"X6" D+M Y.P.									
1st Fl.		28'0" 32'0"			896				
		4'0" 12'0"			48				
		2'6" 3'6"			9		955 + 20% 1144		
RED ROSIN FLOOR PAPER									
Same Area Rough Flooring					955		10		
Side wall Paper, Area Siding					2651		28		
WOOD FURRING STRIPS 1"X2" 12' o.c.									
Ext. Walls					2651				
Por. Beam-facia		2'0" 25'0"			50				
" Ceiling		9'0" 12'3"			110				
Chimney		6'0" 3'0"			18		2820		
FINISH WOOD FLOORS 7/8"X3 1/4" Clear Maple									
L.R. + D.R.		12'0" 31'0"			372 + 1/3		495		
No. 1 COM. MAPLE FLOORS 7/8"X3 1/4"									
Bel. 1st Fl.		14'6" 31'0"			450				
		4'0" 12'3"			49				
		2'6" 3'0"			8		507 + 1/3 676		
FINISH PINE FLOOR 1 1/2"X3 1/4" Flg. 2nd		27'0" 31'0"			837 + 28% 1071				
FIR FLOORS 7/8"X3 1/4"									
Porch		9'0" 17'0"			108				
Front Ent		3'3" 5'0"			16				
Side "		1'6" 3'6"			5				
		3'6" 3'0"			13		142 + 28% 182		
EXTERIOR TRIM - Cypress									
Base		171'0" 1"X4"			171				
		171'0" " 1"X6"			171		171		
Faces		132'0" " 1"X6"			132		132		
		77'0" " 1"X5"			77		77		
Facia Main Rf		156'0" " 1"X10"			156		156		
		60'0" " 1"X10"			60		60		
		30'0" " 1"X6"			30		30		
Soffit Boards		468'0" " 1"X12"			468		468		
" Bottoms		704'0" " 1"X2"			704		704		
		80'0" " 1"X4"			80		80		
		186'0" " 1"X12"			186		186		
"		465'0" " 1"X2"			465		465		
SCROLL BRACKETS									
Main Cornice	4	3'0" 3'0" 4" Face					No. Rs.		
Dormer "	4	2'0" 2'0" 3" "					4		
Front Ent	2	3'6" 3'6" 5" "					2		
Soffit Boards	8	1"X12" 7'0"			56				
Bottoms	8	1"X2" 7'0"			56				
	2	1"X3" 7'0"			14				
	2	1"X1" 7'0"			14				
Facia	2	1"X8" 7'0"			14				
	4	1"X4" 4'0"			16				

Quantity Survey Sheet No. 3

using a tile ridge and staining the shingles to match.

The wide eaves of the California house are almost a necessity, as well as a thing of beauty. In very few houses are they less than thirty inches wide; thirty-six is the average, and four and five feet is not at all uncommon. The eaves at the gable ends have heavy barge boards and brackets of numerous kinds. These brackets are often of single pieces of heavy timber and at other times the timber has a wall brace. In No. 7 these timbers have been used about every two feet, while in No. 5 they are about three feet apart, but in pairs. The ends of the gables are treated in various ways; where large they have the regular gable vents or sash, but where the gables are small, then the ventilator quite often is as large as the whole gable end. The monotony of the side walls is varied in several ways by the use of brick for one story and half-timber for the second, as in No. 3, or simple stucco, as in No. 8. Where shingles or boards are used for the side walls they are at times put on in alternate wide and narrow courses, this causing quite a good shadow.

As to the particular houses here shown, attention is called to a few points about each. In No. 1 the very wide front windows are used and in California they are, in places, made seven or eight feet wide instead of the usual three feet, such as is generally used in this part of the country. They have plenty of sun



Number 6

out there and they believe in letting quite a bit of it get in the house. That reminds me of the fact that the sun is also made to supply the house with hot water. A sort of glass tank is built into a nearly flat part of the roof and the pipes underneath are heated by the sun's rays. In photo No. 4 notice the five long, narrow casement sash which let plenty of air into the room and also make an attractive feature at the front of the house. In No. 5 a good idea is shown which could be followed where two lots have a drive in common. The gable at the drive projects about four feet and with the addition of its three feet of cornice would nearly cover an auto and would surely be quite a pro-

tection when it rained. In No. 6 is shown a good example of flat roof, arch work, stucco walls and tile roof. In the center of the house the tile veranda roof is broken by the stucco parapet wall with its flower boxes. In No. 7 the columns break through the flat roof and with the exposed beams make a porch of very good lines. In No. 8 is shown a house that would be ideal for a west front, on a corner that allowed the living porch to face north. In this way the heavy arches would cut off almost every bit of sun that would ever get to the porch. On the coast in California every house



Number 7

has either a sun parlor on the sea end of the porch or has one end of the porch glassed in. In No. 9 is shown an exceedingly good design for such a house. Every part of the pergola-covered terrace, of the covered entrance porch with its formal flower-boxes and the glass work of the sun porch is well proportioned.

In the first picture is shown a development of the California bungalow that is particularly charming. The illustration shows a little bungalow court or villa. It is usually built into the center of a group of deep lots. A set of houses of from seven to fifteen will be built on three lots 50x150 to 200 feet. To a certain extent, these little houses take the place of apartments. They have, as here shown, only one common walk, but often a drive and a walk on each side of the drive. In the more elaborate ones the drive at the end makes a turn around a fountain or a little pergola summer house. At the entrance the wide drive and the smaller walks are covered by iron arch work, supported by very attractive masonry posts. The central arch usually carries the number of the group of houses and each house is distinguished from its neighbor by having a name. These names are painted on boards which are stained to match the color of the house, the rustic idea of the houses being carried out by hanging these boards from iron chains and having the ends of boards cut to give the effect of splintered wood.

Another thing I noticed was that in the new subdivisions the real estate own-

Form 114		GENERAL ESTIMATE		ESTIMATE No. <u>2</u>	
BUILDING <u>BUNGALOW</u>		SHEET No. <u>4</u>		ESTIMATOR <u>E. Z.</u>	
LOCATION <u>NATIONAL BUILDER</u>		CHECKER <u>m. n.</u>		DATE	
ARCHITECTS <u>NATIONAL BUILDER</u>		SUBJECT <u>GENERAL</u>		DATE	
COPYRIGHT BY FRANK W. WALKER, PUBLISHER, CHICAGO					
DESCRIPTION OF WORK	NO. PIECES	DIMENSIONS	EXTENSIONS	EXTENSIONS	TOTAL ESTIMATED QUANTITY
EXTERIOR TRIM - CONT'D					
	2	1" x 2"	7'-0"	14	14 L.F.
	2	1" x 3"	7'-0"	14	14
Rail Trim	2	1" x 6"	16'-0"	32	32
" Top	1	2" x 18"	14'-0"	14	14
SIDE ENT. Coping Tr.	4	1" x 4"	20'-0"	80	80
	2	1" x 3"	18'-0"	36	36
		1" x 2"	2'-0"		2 N.B.
Scroll Pergola Brackets	6	2" x 8"	3'-0"		25
		1" x 4"	16'-0"	16	16 L.F.
PORCH Rail Top		2" x 8"	25'-0"	25	1" x 1" 14
" Trim	2	1" x 3"	25'-0"	50	1" x 2" 15
Beam "		1" x 4"	25'-0"	25	1" x 3" 86
		1" x 2"	25'-0"	25	1" x 4" 219
Pergola Strips	2	1" x 2"	27'-0"	54	1" x 6" 14
" Scroll Brackets	19	2" x 8"	3'-0"		1" x 8" 14
" Base		1" x 4"	42'-0"	42	1" x 12" 14
Cop Trim	4	1" x 3"	2'-0"	8	2" x 18" 8
	1	2" x 8"	8'-0"	8	2" x 18" 8
		1" x 4"	44'-0"	44	44
FRONT ENT. STEPS					
Stringers	2	2" x 10"	6'-0"	30	
Risers	5	1" x 8"	5'-0"	17	72 F.B.M.
Treads	4	1 1/2" x 10"	5'-0"	25	72 72
SIDE ENT. STEPS					
Stringers	2	2" x 10"	4'-0"	13	
Risers	3	1" x 8"	4'-0"	8	31 F.B.M.
Treads	2	1 1/2" x 10"	4'-0"	10	31 31
REAR ENT. STEPS					
Stringers	2	2" x 10"	3'-0"	10	
Risers	2	1" x 8"	4'-0"	5	25 F.B.M.
Treads	2	1 1/2" x 10"	4'-0"	10	25 25
BASEMENT STEPS					
Stringers	2	2" x 10"	14'-0"	47	
Treads	11	2" x 10"	4'-0"	73	
Risers	12	1" x 8"	4'-0"	32	
Nails	2	4" x 4"	4'-0"	11	
Rails	2	2" x 4"	14'-0"	19	19 F.B.M.
Bracing	6	4" x 4"	6'-0"	48	230 230
LAUNDRY PARTITIONS					
Plates & Girts	6	2" x 4"	14'-0"	56	56 F.B.M.
Studs	16	2" x 4"	8'-0"	80	141 141
Sheathing 1x6 D.P.I.	2	24'-0" x 7'-6"		375 + 20%	1450
Batten Door	1	2'-6" x 6'-6"			1
COAL ROOM PARTITION					
Plates & Girts	2	2" x 4"	14'-0"	28	28 F.B.M.
Studs	12	2" x 4"	8'-0"	64	92 92
Sheathing 1x6 D.P.I.		14'-3" x 7'-6"		107 + 20%	128
MOOD COAL SLIDE	1	3'-0" x 9'-0"			1
CISTERN COVER	1	2'-0" x 2'-0"	Door with 2" x 18" Plank Frame		1
MILL WORK AND INTERIOR FINISH					
Windows - Bsm't	4	3'-0" x 2'-0"	6 ft 10 x 8" Plank Fr. 1 1/2" Sash, Top, Hdr		4
	2	3'-0" x 1'-6"	3" x 10" " " " " " "		2
	1	3'-0" x 1'-10"	6 ft 10 x 8" " " " " " "		1
1st & 2nd Fls.		Box Frames 4" Studs, Exterior Corners, 1 1/2" Sash, D.H. Interior Casings, Sash & Hdr. Sills, 1 1/2" Yellow Pine Trim.			
	1	3'-6" x 4'-4"	2 1/2" x 12" " " " " " "		1
	2	7'-0" x 3'-4"	2 1/2" x 12" " " " " " "		2
	3	8'-0" x 4'-4"	2 1/2" x 12" " " " " " "		3
	1	3'-0" x 4'-4"	2 1/2" x 12" " " " " " "		1
	2	3'-4" x 3'-4"	2 1/2" x 12" " " " " " "		2
	1	3'-4" x 4'-4"	2 1/2" x 12" " " " " " "		1
	2	2'-10" x 3'-4"	2 1/2" x 12" " " " " " "		2
	1	3'-8" x 3'-4"	2 1/2" x 12" " " " " " "		1
	1	6'-0" x 3'-4"	2 1/2" x 12" " " " " " "		1
	1	9'-0" x 3'-4"	2 1/2" x 12" " " " " " "		1

building ideas mentioned above the California house would not be nearly as attractive as it is if it were not for the flowers. Every house out there looks attractive, but if here in the South we could have the ugly houses covered with beautiful purple blossoms, such as the boughanvilla vine produces, and all unsightly places hidden from view by a geranium hedge six or seven feet high the house left to view would, I am sure, compare favorably with those on the other side of the continent.

SUCCESSFUL ORGANIZING

Mr. Builder, if you are not a member of a builders' association, join one as soon as you can. If there is no association in your vicinity start one yourself.

Organization, association, and getting builders interested in their local associations and keeping them interested is the big fundamental work. This was the idea expressed through all the speeches at the convention of the Master Builders' Association of Wisconsin, January 8 to 10. J. W. Jungbluth, chairman of the entertainment committee of the Milwaukee Master Builders' Association, described some of the methods used by his committee. The first thing was to provide a good attraction to bring the builders together.

A bowling tournament was staged, but was only moderately attended. Some didn't care for bowling. Card parties were tried, with about the same success. Then notices were sent out and the town was districted, and each member of the committee was given a section to work by telephone. Notices are sometimes pigeonholed and forgotten or put in the wastebasket. But the object of the telephone call is to exact a promise to attend the entertainment.

Success met the efforts of the committee. It was determined to raise money for a summer outing. A picture show was the method used to raise the funds. This was followed by card parties and dances, and the social intercourse was kept alive. Builders got to really know each other.

The summer outing was a great success. With the funds raised everything was furnished for the holiday crowd—refreshments and entertainments. There were three hundred and forty on the grounds that day.

The man who is not in his association is not doing himself justice. Enthusiasm will find the way to make an association a one hundred per cent association.

There is no man more interesting to talk to than the man who is interested in the things you are interested in, and we are all interested in practical building.

PRACTICAL		Form 114		BUILDING <u>BUNGALOW</u>		GENERAL ESTIMATE		ESTIMATE No. <u>2</u>	
LOCATION		ARCHITECTS <u>NATIONAL BUILDER</u>		SHEET No. <u>6</u>		ESTIMATOR <u>E. L.</u>		CHECKER <u>M. W.</u>	
SUBJECT		DATE		DATE		DATE		DATE	
COPYRIGHT BY FRANK E. WALKER PUBLISHER CHICAGO									
DESCRIPTION OF WORK	NO. PIECES	DIMENSIONS	EXTENSIONS	EXTENSIONS	TOTAL ESTIMATED QUANTITY	UNIT PRICE M/T/L	TOTAL ESTIMATED MATERIAL COST	UNIT PRICE LABOR	TOTAL ESTIMATED LABOR COST
WOOD STAIRS-CONT'D									
Newels	2	6" x 6" 4'-0"				15			
Shoe Rail & Fillet		3/4" x 2 1/2" 12'-0"				12			
Hand Rail		2 3/4" x 3" 12'-0"				12			
Balusters	78	1 1/8" x 1 1/8" 3'-0"				28			
ROOFING Composition Shingles									
		33'-0" 14'-0"		1045					
		29'-0" 15'-0"		435					
		21'-0" 3'-0"		63	595				
		8'-6" 6'-3"		53	1596	16			
SHEET METAL WORK									
Tin Roofing		9'-0" 12'-3"		110					
		4'-0" 12'-0"		48		595			
		3'-6" 9'-0"		32	190	2			
G.I. Ridge		42'-8" 1'-0"		42		42			
" Flashing		31'-8" 1'-0"		131		131			
G.I. Gutter		76'-0" lineal				76			
" " V		22'-0" " 12" girth				22			
" " V		12'-0" " 8" "				12			
G.I. Downspouts		30'-0" 1 in 4" diam				30			
		20'-0" " 2" "				20			
PLASTERING									
EXTERIOR STUCCO		Area - 0.5 Wall							
3 Coats - on Metal Lath		30'-0" 1'-3"		38					
Inside Ver. Rail		1'-6" 3'-0"		5		59.43			
Side Ent. Gail		3'-6" 6'-0"		21	271.5	302			
INTERIOR PLASTER 3 Coat Work on Wood Lath									
Ceilings 1st		31'-0" 27'-8"		837					
		4'-0" 12'-0"		48					
		2'-6" 3'-0"		8					
2nd		12'-0" 13'-6"		162					
		11'-0" 13'-0"		143					
		12'-0" 8'-0"		96		59.43			
		7'-0" 18'-6"		130	1424	158			
Exterior Walls 1st		13'-0" 8'-6"		1122					
2nd		116'-0" 8'-0"		928					
Partitions 1st	2	98'-0" 8'-6"		1666		59.43			
2nd	2	75'-0" 8'-0"		1200	4916	546			
METAL CORNER BEADS 15 8'-6" lineal									
				128		128			
Bullnose Plas Corners		25'-0" lineal				25			
Arches & Columns	1	Triple Arch, 2 Col + 2 Pilasters (See Detail)				1			
PAINTING & VARNISHING									
FINISHING WOOD FLOORS - Varnish Finish Maple						9			
" " Pine						8			
" " Fir						14			
PAINTING - Exterior Trim						22			
" Stairs & Steps						1			
Bsm't, Hall, Partitions, Windows						10			
Exterior Windows & Trim						5			
" Screens & Doors						5			
" Metal Work						2			
VARNISH FINISH - INTERIOR									
Doors & Windows		" Est.				3			
" " " "		" "				2 1/2			
Doors, Trim & Cased Openings						13 1/2			
Base, Pict. Mold, Etc.						9			
Cabinets, Cases, Stair nosing						7 1/2			
HEATING									
1		Furnace with Dust & Registers Complete							
PLUMBING									
1		Basement Sink & Roughing In				1			
1		Low flush box W.C.				1			
1		Kitchen Sink &				1			
1		Bath tub				1			
1		Lavatory				1			
2		Floor Drains				2			
		Water Service Connection to Street Main				1			

GENERAL ESTIMATE						ESTIMATE NO.	SHEET NO.	ESTIMATOR	CHECKER	DATE
FORM 114										
BUILDING BUNGALOW										
LOCATION										
ARCHITECTS NATIONAL BUILDER										
SUBJECT										
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DESCRIPTION OF WORK	NO. PIECES	DIMENSIONS	EXTENSIONS	EXTENSIONS	TOTAL ESTIMATED QUANTITY	UNIT PRICE M/T/L	TOTAL ESTIMATED MATERIAL COST	UNIT PRICE LABOR	TOTAL ESTIMATED LABOR COST	
<u>PLUMBING - CONTINUED</u>										
Sanw Service Connection with street Main					1					
Gas Piping (if any)					1					
1 Hot Water tank					1					
2nd Fl. Tank & Roughing In					1					
Stacks					1					
Catch Basin (if any)					1					
<u>ELECTRIC WIRING</u>										
8 Switch Outlets					8					
16 Ceiling Light "					16					
1 Elec. Door Bell & Wiring					1					
<u>ROUGH HARDWARE Nails, Screws, Sash Weights, Cord, Etc.,</u>										
<u>LIGHTING FIXTURES</u>										
<u>FINISH HARDWARE By Owner</u>										
<u>DECORATING</u>										
<u>LIABILITY INSURANCE, Fire Insurance,</u>										
<u>BUILDING PERMITS</u>										
<u>SUPERINTENDENCE</u>										
<u>PROFIT</u>										

KEEP PREPARED AGAINST MINOR INJURIES

A simple outfit, kept in a handy place, in a special case or box, on the job, also in the shop or factory, will prevent many minor injuries, such as nail punctures, slight wounds or abrasions, from becoming serious. However, all such injuries should not be neglected after the first aid application.

If an injury is anything more than of a minor nature no time should be lost to send the injured employe to a doctor.

The following is an effective outfit:

A 3 ounce bottle of iodine solution.
A bottle of aromatic spirits of ammonia.

A roll of absorbent cotton.

Several rolls of one or two inch bandage.

Collapsible tubes of bi-carbonate of soda mixed with vaseline. (For burns.)

A package of silk-worm gut. A small piece of this, doubled and inserted into a nail puncture and left there, will per-

mit air to reach the wound and kill the lock-jaw germs.

The foregoing simple treatment has proven remarkably effective in about 1,800 cases of nail punctures treated during the construction and the wrecking of the great Chicago World's Fair buildings, not a single case of infection or lock-jaw developing.

Another inexpensive First Aid Outfit is given below. It was recommended some time ago by the physician of a large Milwaukee corporation, and in an article written by him, and which was endorsed by the Industrial Commission, he said: Every shop employing four or more men should have at least one Emergency Case. A very excellent case can be purchased for a small sum of money.

For a number of years the said corporation has furnished first aid boxes to its employees when working away from the main plant, the same consisting of the following:

An ordinary japanned cash box, 6x9½ inches.

A 6 ounce bottle tincture of arnica or hydrogen peroxide.

A 4 ounce jar lassar paste or antiseptic salve.

A roll or carton of absorbent cotton.

A dozen or two of 1 inch and 2 inch bandages.

A piece of absorbent cotton, saturated with the arnica or peroxide and placed on the cut or wound and then bandaged with a roll of 1 inch or 2 inch bandage, which is not used again, makes a fairly sterile antiseptic and soothing dressing. Where salve is needed it is to be used in the same manner as above.

A competent doctor should be called, or the injured employe sent to him, in all cases of injury, except those of a minor nature.—*Builder's Bulletin.*

A WELL-DESIGNED JOBBING CARD

As a means of gathering all the facts regarding materials and labor entering a job on which to base charges the accompanying reproduction of a jobbing

CAPITAL CONSTRUCTION CO. JOBGING CARD

For see also 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 **Job**

Address

Charge to

[illegible]

Workman -----

DO NOT RETURN THIS CARD UNTIL WORK
SPECIFIED IS COMPLETED.

card designed and used by the Capital Construction Co., of Madison, Wis., is a fine example. It has proved valuable in the company's practice. The size of the original card is 4 by 6½ inches.

SATISFACTION

By **satisfying** your customer
you are making the building
business a better business.
You owe reputation to the
building trade.

Specialized Apartment Buildings

By Chas. E. White, Jr., Architect

Novelty and Dignity of Design, with Ingenious and Practical Use of All Space,
Attract Tenants

NO matter in what section of a town and regardless of the class of tenants you are able to secure the apartment buildings which rent the most readily and yield the biggest profits are those which are "unusual" in design and plan. Not that a flat building should be a "freak," or contain silly, unnecessary features just for the pure oddity of it, but you will find as a general proposition that if your apartment building is different from any other in town and if this difference lies along practical lines, making the apartments more convenient, comfortable and livable, your building will have a greater renting value than any other in town.

"Class" Value

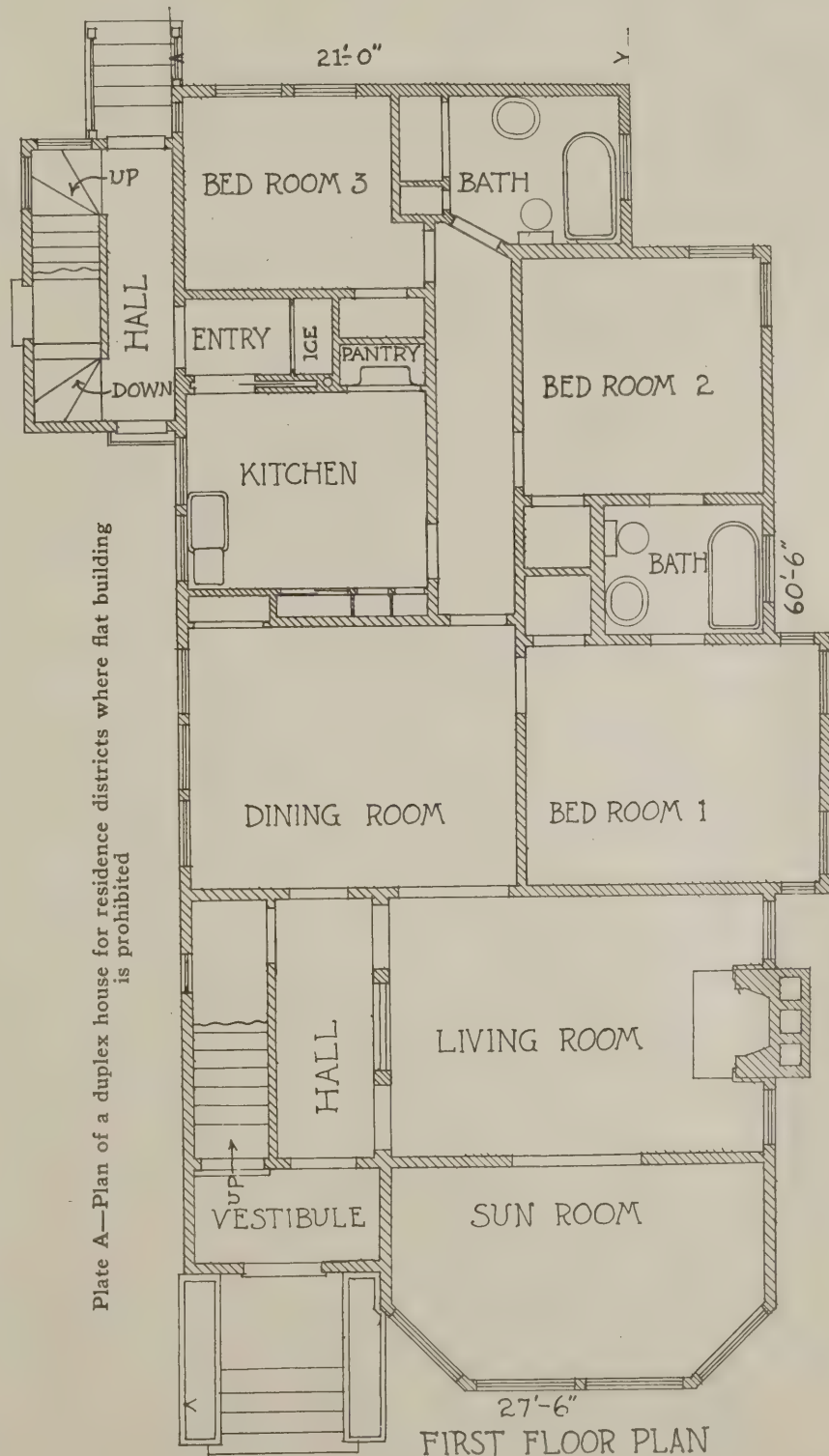
In other words, try and eliminate competition as much as possible by constructing a building so individual in character that no existing building can compete with it. Put your building in a class by itself; if tenants want desirable features such as are contained in your flats they must come to you because these features can be obtained in no other building.

To consider, first, the small town investment problem, let us imagine a well-to-do section where rents are high, such as may be found in almost every town or city with a population upwards of 25,000. A type of apartment which has been found profitable in many places is what is known as the "duplex house." This is usually a two-flat building, though in some instances four flats are provided. The main idea is to have the building look as much like a private home and as little like the regulation flat building as possible.

Duplex Houses

Duplex houses are most frequently built right in the fine residence district of a town, where they prove quite as attractive as any of the surrounding property. Usually there is a sufficient border of lawn about the building to carry out the private home idea, and the entrance itself contains but a single door, precisely like an ordinary residence.

As a renting proposition in a town of sufficient size to warrant generous rents the duplex house is excellent. A distinct novelty, there is always a brisk de-



mand for them, and the class which appreciates them is of a high order. Usually such tenants have automobiles, so it pays to erect a garage on the lot much like a private garage, but with a separate

and three bedrooms, the rear one often being for the maid.

The Sloping Roof

Another characteristic of the modern duplex house is the sloping roof which

it as a flat building. Therefore, in planning a duplex house (which is to appeal to a special class of people) you must try and avoid the regulation flat building plan as much as possible. In other words, people who want to live in an ordinary flat building will rent where there is one; if you are going after a different class of tenants you must provide something they cannot get elsewhere.

Windows

The typical arrangements of windows in a flat building is, of course, second story windows placed directly over those below; therefore, in your duplex house try and have some of the second story windows *not* over those below. In the duplex house illustrated a little difference between first and second stories was obtained by using a projecting bay window in the second story dining room, not like the window below.

The flats in this building rent for \$90 each, and the owner finds that he has a profitable investment and one so popular with tenants that he gets occupants of the highest class and his flats are always rented.

It is not the purpose to discuss in this article the more ordinary type of flat buildings many excellent plans of which are frequently to be found in pages of NATIONAL BUILDER, but to keep to the more specialized and less usual apartment type which appeals to a particular class of people. As the next feature of our study, let us consider a new kind of apartment building which has just come to the front in cities of more generous size, where the larger population makes it practicable.

In considering property in a city the problem of the architect and builder whose duty it is to safeguard the interests of the building investor is to make a certain piece of property yield the greatest amount of profit. Thus, for instance, a lot which is 100 feet wide and



FRONT ELEVATION

Plate B—Front elevation of a duplex house. Designers strive to make these two-flat buildings look like private homes

room for each tenant. The rent of the garage itself is added to the rent of an apartment and a further profit thus secured. At the same time you are appealing to the "automobile" class, people who are good, substantial citizens, with money enough to buy what they want.

The duplex house illustrated, of which a single floor plan is illustrated in Plate A, houses two families, one downstairs and the other upstairs. It is built in the fine residence district of a Chicago suburb, where it proves popular not only to tenants, but also to neighbors living in their own residences. Often residence districts like this are restricted and ordinary flat buildings are not permitted. In such, the duplex house solves the problem by providing a building quite as attractive as any private home. Thus, you can get a commercial profit out of your high-grade property without creating enmity with neighbors having private homes nearby.

Note, in examining Plate A, that the single front entrance opens into a vestibule from which a private door leads to each flat. The arrangement of rooms is luxurious and each room is more ample in size than are those in the regulation flat. Two bathrooms are provided,

permits bedrooms for servants in the attic and provides those ample storerooms always popular with housekeepers. From the exterior the sloping roof gives, again, the private residence appearance not obtainable with any other type of roof.

If you will study the plan of any ordinary flat building you will find that it has certain visible features which stamp



SIDE ELEVATION

Plate C—Side elevation of a duplex house. The floor plans are shown in Plate A

which is much more expensive than the lot of similar size in small towns, would not prove practicable for a duplex house or for the regulation apartment housing but two, four or six families. It is often a case of providing a large building containing upwards of twenty apartments in order to make the property yield sufficient revenue to make such a project profitable from the standpoint of the owner.

Smaller Rooms, Larger Profits

Now, all things being equal, the type

increases your profits. It means smaller apartments, and more of them.

It has been found in cities of sufficient size that there are several classes of people who do not have families, such as *newly married couples* and *elderly couples* (whose families have been "raised" and are no longer to be taken account of in the family nest). Thus, in these classes it is a two-person proposition—man and wife, or mother and daughter, or sister and brother. Add to these classes attracted to small apartments the big class

who want to do their own work and yet have plenty of time to go out in the world as well.

Plate E shows the arrangement of rooms in one of these apartments containing two principal rooms—the living room and dining room. Wall beds are concealed in both rooms, thus converting them at night into comfortable bedrooms. A small kitchen is provided with a breakfast room at one end.

To those who have never seen one of these buildings the idea may appear im-



A Two-Flat Building That Looks Like a Private Residence

of building which will house more families per cubic foot than any other is the best investment for the owner, because yielding him the largest amount of profit.

Roughly stated, you can get a building of such-and-such size on a 100-foot lot (we will say); then, by reducing the size of the apartments you can increase the number of families and not greatly in-

crease the cost of the building. This of bachelors, and another class—business women—and you find a large number of people who are available as possible tenants. For these people the apartment of two or three rooms in which every comfort is provided and living is reduced to the minimum of labor is ideal. No servants are required, and this is a further inducement for women

practicable, but the fact is these little apartments are ideal for two persons. When properly designed they are very attractive; wall beds are just as comfortable as any beds, and they are so easily pivoted into the closets behind them they are no trouble at all. A model of neatness and convenience is the little kitchen and the breakfast room (which is actually but one end of the kitchen from which it is partially screened by

means of cabinets) can be used for serving all the meals if desired.

Renting Value

When you consider how many of these apartments can be built in the building of ordinary size you realize how greatly increased its renting value is over the values secured in an ordinary apartment building. Unfurnished, but of course heated and with janitor service, they often rent for from \$50 to \$60 per month. Often these apartments are rented furnished with all that is necessary to keep house, such as furniture, rugs, pictures, kitchen apparatus, china, glassware—everything, in fact, except table linen and bed linen. In this manner they usually pay best, as consider-

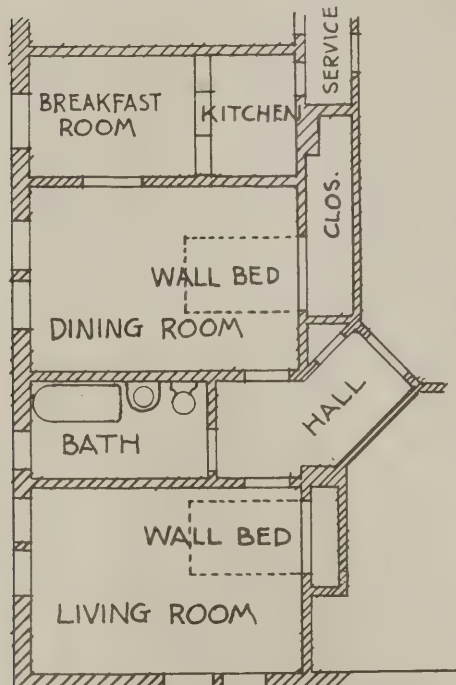


Plate E—Small, comfortable and ingeniously planned, these apartments are very popular

able profit is derived from renting the furnishings in this way; also, you appeal to people who have not yet acquired furniture for housekeeping, or who do not care to be bothered with maintaining their own furniture. Frequently the rent for apartments such as these is as high as \$75 to \$85 per month, including cleaning and dusting service supplied by the management.

Many of these apartment buildings are called "apartment hotels," and regular hotel service is maintained for those who want it. Food can be ordered from the public dining room, served in the apartment. All service required in housekeeping is undertaken by hotel maids when desired; much like an ordinary hotel, a smoking room, parlor, library and billiard room are maintained on the first floor for the use of tenants.

For an apartment building or apart-

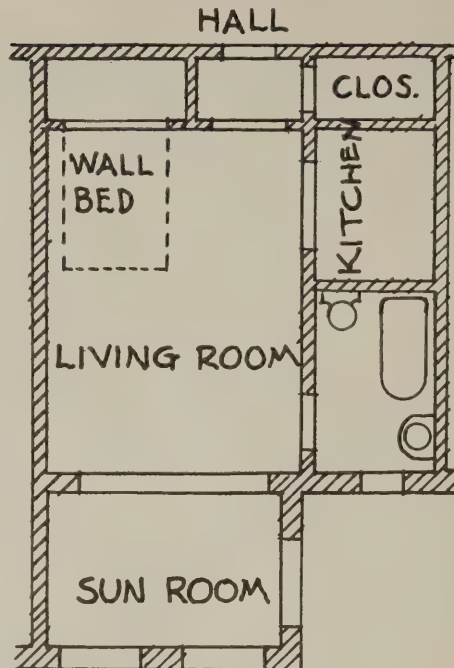


Plate F—There is a great demand for these tiny flats

ment hotel, where the space given to apartments has been reduced to even smaller area, examine Plates F and G. Apartments such as these are sufficient for many families of two persons each. Rents can be reduced to the minimum, and at the same time provide sufficient profit to make the investment worth while.

As a good example of a more spacious apartment you will find Plate H quite interesting. This plan provides but one bedroom in each flat, but built-in wall beds can be utilized in living rooms and dining rooms when desired, thus comfortably providing for families of three or four persons.

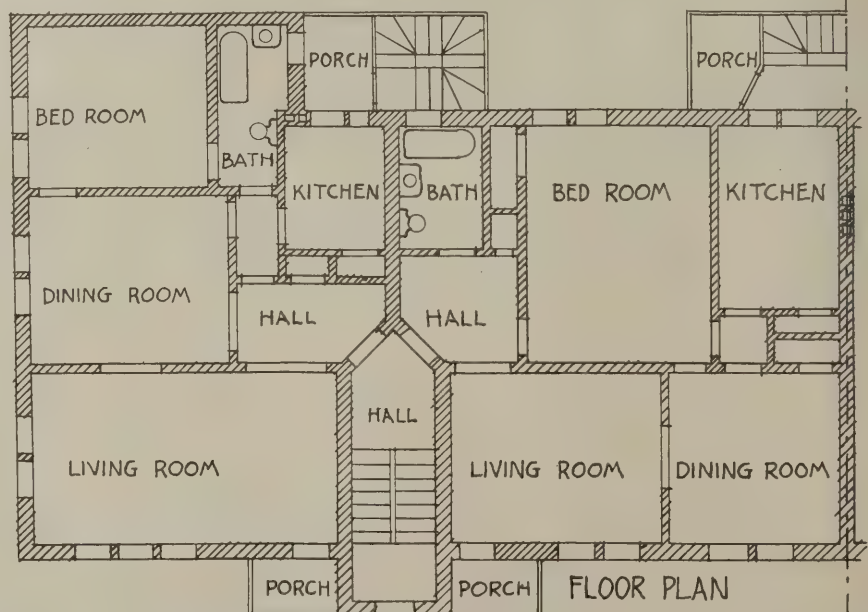


Plate H—A popular arrangement of rooms which may form the basis of a good building job to any wide-awake contractor

Apartment Building for Profit

Building apartment buildings for profit is a highly specialized business and the builder should give it every consideration and become expert in the various types of building for investment. Many such buildings are "promoted" by local builders who, not content to sit back and wait for business, have the necessary energy to go out and interest capitalists in profitable building projects.

In these after-war times of reconstruction this opens up another avenue for the wide-awake contractor, many of whom have already profited by their foresightedness in urging and building

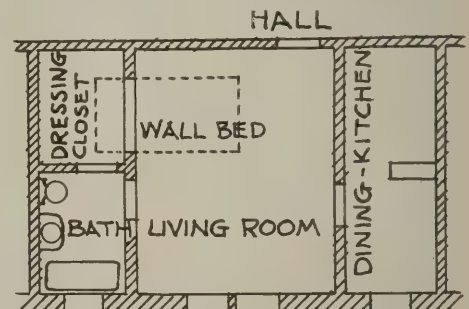


Plate G—The life-in-one-room style which is much promoted

apartments for special tenants, buildings which really pay in dollars and cents and are successful from every standpoint—successful as to profit, successful as to comfort, successful as to architectural appearance. What more can an investor ask for?

We are indebted to the following well known architects whose plans are illustrated in this number: H. R. Wilson and Company; E. J. Ohrenstein; Ottenheimer, Stern and Reichert; Spencer and Powers; Charles E. White, Jr.

Are You a Builder?

By Wm. Robinson Safford

Here are a lot of pointed questions and helpful suggestions that every builder will appreciate. The man who is following these ideas will know their value and get new inspiration, and the man who is not may well consider them.—Editor.

THERE is a great difference between a carpenter, a mason and a builder. The difference is this—a carpenter is a man trained to build in wood. He knows all about framing a building and can tell you every technical detail about sash, doors, frames, trim and the hundred-and-one things which go to make up the work of the carpenter—but his knowledge of plumbing, painting, electric work and masonry is merely superficial. He has no judgment when it comes to the other fellow's work.

The mason is in the same boat. When it comes to carpenter work he is at sea. His chief knowledge of carpenter work

is the little he gets when carpenters come in contact with his work. He knows something about *setting* window frames but has little knowledge of how they are made. He understands something about building joists into a brick wall, but if you ask him anything about framing you discover that he has been *too busy* working at his trade to gather much knowledge about other trades.

Trades Closely Allied

No trades in the world are so closely allied as the building trades. Think of the multitude of mechanics necessary to produce a modern building: stone masons, brick masons, concrete masons,

framing carpenters, finishing carpenters, outside painters, inside painters and glaziers are required, each working in close correlation with every other trade. Then there are plumbers and heating men, electricians and fixture hangers, glaziers and decorators, tile setters, floor layers, plasterers and pavers. Sheet metal workers build the gutters, roofers lay the slate, tile or composition roofs, sewer diggers do the outside sewer work; there are graders and excavators, teamsters, auto truck drivers and laborers.

More Brains in Building

It takes some brains to build a building these days. You have got to be



A LESSON IN THE EFFECTIVE USE OF MATERIAL

The long horizontal lines of this house were obtained by projecting courses of brickwork. First, three courses set flush; then one course projecting; then one course flush; next projecting, and so on. A simple, inexpensive brick can be used in this way to produce something new and attractive. Builders who know these little tricks in brickwork get the business. Frank Lloyd Wright was the architect of this building.

something more than a carpenter or a mason—you've got to be a builder.

There was a time when each man was supposed to know nothing but his trade. The same carpenters who framed the building made their own window frames, laid the floors, shingled the roof, made and hung the doors and put on the interior trim. Now men specialize in different portions of the work.

Masons who formerly laid stone or brick with equal facility, and often did plastering as well, now usually confine their endeavors to one kind of masonry and attempt to do it quickly and efficiently.

Responsibility

This specializing of work tends to divide the responsibility. The carpenter isn't interested in what happens to the brick piers which supports his floors, and the mason doesn't care a hang whether the roof is tight or not. The owner, however, is vitally concerned. He wants a complete building. He wants it to be weather-proof. He wants it to be cool in summer and warm in winter, and to suit him it has to be constructed well enough to prove durable and look attractive.

To the *real builder*, the man who is something more than a mere carpenter or ordinary mason, there are many vexing problems to be solved. He is the contractor, interested not merely with this or that trade, but concerned with the completed building as a whole. If the carpenters fall down, or if the masons or plumbers do a poor job, or if the glass in the sash is full of bubbles or the roof gutters sag and slop over, he is the man who is responsible.

Some builders fail to make good with an owner because they shirk the responsibility which the owner rightly puts on their shoulders. They let sub-contracts for different parts of the work and then lose all interest in any of the trades in which their own men are not employed. They leave it to the architect or the owner to see that other branches of the work are executed properly.

A builder must do more than this; he must be so familiar with every branch of the building trades that he can criticize a piece of work, whether it is plumbing, masonry, painting or digging. He has got to be an all-round man, one who knows his business through and through—one who can guide masons with the same facility with which he controls carpenters, painters or plumbers.

Carpenters Should Know Masonry

Carpenters should know a good deal more about masonry than one might think necessary, for these two trades, carpentry and masonry, come very close together. They go practically hand in hand, and you will usually find that carpenters and masons are on the job prac-

tically at the same time. Just as soon as the foundation is built the carpenters come on the job, but even before this they may have something to do there; for instance, when the batter boards are set up, before the excavating is begun; usually these batter boards are set by carpenters, and in most architects' specifications this work is so specified.

Right here, we have all seen carpenters careless about setting batter boards, sometimes putting them so close to the building excavating that they are soon knocked down by the teams. Later, when somebody wants to get a level, or check up the dimensions of the foundations, there are no batter boards to check by. Put your batter boards clear outside of the building excavation, carpenters. Use good, stout, long stakes to nail them on, and let them stand if possible until the building is entirely completed. Then you can always go back and figure when necessary; there can be

Service

Is the Keystone word today.
Giving the *best there is* in
the *best way* is service. Are
you really trying for better
construction?

no dispute with the owner about lines or levels.

Masons Should Know Carpenters' Needs

One annoying habit of masons when they are careless is the free and easy way they sometimes level up a foundation wall and, later, when the carpenters come along to lay the sill they have to shim it up on pieces of wood to get it level. A sill ought to be absolutely level, and there is no reason why a foundation wall should not be brought up to a perfect height ready to receive the sill. Watch this point a little more closely; builders. The sill sets the level of the entire building; if the sill is out, the entire structure will be out.

When the building is of masonry the shelf for floor joists should be carefully checked up by the carpenters to make sure it is level for the floor joists. Don't depend upon the masons for this. See to it yourselves and avoid future trouble.

Builders should be familiar with all branches of masonry and then they can take contracts for entire building structures. Even though they sub-let the mason work, carpenters should know just as much about bricklaying and stone setting as masons themselves. They don't have to be able to take up a trowel and lay brick, of course, but they should know a good job of brick-

laying when they see it, and they should be able to understand whether the mechanics are doing a good job by merely watching them at work.

Two Methods of Laying Brick

There are two general methods of laying brick. The old-fashioned way is to spread a full bed of mortar all along the wall, carefully set each brick, tap it down with a trowel, and then slush mortar all along the top of a course. This is the manner they still employ in Europe and, usually, in the New England states.

The western method is to "butter" the ends of each brick, set it on the wall (having first prepared a bed of mortar), then slush up the course. This is a quicker way, and though such a wall, theoretically, will not be so well bonded, actually it is a very good wall indeed if the slushing process is carefully carried out to fill all the cracks between the brick. Bricklaying by the western method is usually faster than by the eastern method, hence it is popular with contractors. See to it, builder, that your masons keep their wall well slushed.

When it comes to stonework common sense will suggest that plenty of through stones should be put in the wall—good, solid chunks extending clear through the wall. Then between these big stones you must expect, of course, little stones. The cavities between the big stones, however, should be filled with stones of reasonable size (not chips) and well slushed with mortar. Then the entire wall will set up good and solid.

Art Side of Brickwork

A knowledge of good brickwork is necessary to the builder, be he carpenter or mason, and he should know not only the practical side of bricklaying, but the artistic side as well. For instance, do you study new brick buildings in other towns, especially the work of talented architects, to get some of their new ideas in architectural bricklaying?

Often you will find they get an unusual and pleasing effect with face brick by combining two kinds of different shape; first a course of long, narrow brick and then a course of short, wide ones. Then there are the various face treatments of brick in two colors; a light tan shade combined with dark brown, or red brick combined with brick very much darker. Often you can get an unusual effect by merely projecting every other course slightly beyond the wall.

You must build up a reputation for good taste in building as well as for honesty in construction, for in that way you will make a hit with architects as well as owners. "He is a good builder because he has some ideas of his own," a big architect said to me recently. "If you want to get any new and novel ef-



ONE OF THE LATEST MODELS OF CONCRETE HOUSES

Just before the war concrete houses began to be popular; during the war the government built many of them; now that the war is over wise builders are getting familiar with this kind of work so as to be able to do further construction along this line. This house, designed by Fernkes & Cramer, Architects, is one of a group of buildings typical of a very late mode of building



FLOOR CONSTRUCTION ILLUSTRATED ON A ROOF

This system of reinforced construction is as applicable to floors as to roof construction in which it is shown in the photograph. Ordinary steel pipe and expanded metal are used. There are many good systems. Learn them!



PLEASING EFFECTS WITH FACE BRICK

Many a builder has landed a good job because of his reputation for artistic taste in building. Familiarize yourself with some of the pleasing effects obtained with face brick. This shows the novel appearance when two kinds of brick are combined -- a course of narrow alternating with a course of wider brick.



CAN YOU SET YOUR OWN STEEL?

The builder who knows how to set his own steel has a big advantage. All you need is a derrick, a few skilled men and some brains. You can save the price charged by subcontractors, and you can have the job done when and as you want it.



FIREPROOF FLOORING

Demand for fireproof floors is active and increasing rapidly. There are a number of methods of combining hollow tile and concrete for fireproofing. The type illustrated here consists of a thin layer of reinforced concrete, on which hollow tile grouted in concrete is laid.

fects you'll find he has fine taste, and what he tells you, you can bank on." A reputation like that goes a good ways toward getting business.

Structural Steel Work

Masons as well as carpenters should know enough about structural steel to be there with the goods when it is necessary to set a girder or erect a post. The builders who make money are the ones who can tackle any part of the work; they are not dependent upon others to do their thinking for them. You can waste about as much money setting steel as you can in any other way. Just have a few men fussing around hit or miss, setting a heavy girder without the help of a derrick or other tools to do

the job properly, and see how quickly it runs into money.

Did you ever see a gang of men set a girder, and then, when they got it all placed, after several hours' laborious work, find that it was not level? It is to little things like these that the builder must give his personal attention—to see that there are just men enough to do the job, with labor-saving tools—and that the work is quickly and accurately done.

Fireproof Floors

Every builder should be familiar with the different types of fireproof floors, whether he constructs these floors by his own men or sub-lets them to others, because these are times of rapid improvements in floor building. Probably no branch of building construction has

grown so wonderfully as the fireproof floor proposition, for houses as well as larger buildings. America is ahead of the world in demanding the best in construction. Different floor systems are so widely advertised in magazines which circulate liberally among owners as well as architects and builders that their products are in ever increasing demand. This demand will continue; builders, in order to talk intelligently with their customers, must familiarize themselves with different types of floor construction.

Two Classes of Fireproof Floors

Fireproof floor systems can be broadly divided into two classes: those composed of reinforced concrete and those composed of combinations of hollow tile and reinforced concrete. All floor systems are comparatively easy to understand. There is no hocus pocus about them. Manufacturers of fireproof floor products have it all worked out so that the safe loads are as easily computed as safe loads for a wooden floor. If you can't figure it yourself, they will figure it for you.

Get familiar with fireproof floor construction by sending to manufacturers and agents for catalogs. Get familiar with fireproof partitions composed of hollow tile, gypsum blocks, concrete blocks or what-not. If there is anything new in construction which you do not understand, write to the advertiser for further information. Even if you don't have any immediate use for that material the time may come when you may want it, and want it quick. Don't wait until that time comes; investigate it now and store the knowledge up in your brain. It will not take up much room there.

Big Building Era Coming

We are entering an era of tremendous building, if we are to believe statisticians and other experts who have their fingers on the business pulse of the world. Be prepared for your share of this business and no matter how much you know about building, try and know a little bit more.

Send for and Save Catalogs

Your home or office ought to be the abiding place of a constant stream of printed matter sent out by material dealers, agents, manufacturers—advertisers who are in the forefront of improvements in the building industry and, seeking a market for their goods, are ready to shoot their literature at you if you will only express an interest in it.

Your desk ought to be the repository of every pamphlet to be had devoted to building operations. You should investigate the merits of each article, system or process useful in building, and after you have studied the contents of a catalog or pamphlet, file it carefully away

where you can get it at a moment's notice.

Concrete houses and other buildings should be understood by you so that you can intelligently approach any concrete problem if the occasion offers. Concrete can be used in many different ways and you should be familiar with each way. You can build a house of concrete blocks and leave the blocks to show after the house is completed—or you can plaster the blocks over to hide them. You can build the walls of solid concrete, or one

of the various systems of hollow concrete wall construction may be used. You can build of brick, and plaster it with cement-plaster on the outside, or you can build with hollow tile and plaster on the outside.

Then, of course, there are the various types of metal lath on wood frame, plastered on the outside, to say nothing of wood laths, plastered.

All of these types have been used successfully many, many times. Some of them have failed because the builder did

not know how to use the material correctly.

Be a Builder in Any Material

A watchmaker might be able to build a good automobile if he knew all about automobiles, and a street car conductor would make a good lawyer if he studied the law. A builder can build anything, of any material, in any way, at any time, if he prepares himself for it by acquisition—which is *building*—not merely carpentry, masonry, plumbing or painting.



1



3



4



2

NOVELTIES IN BUILDING

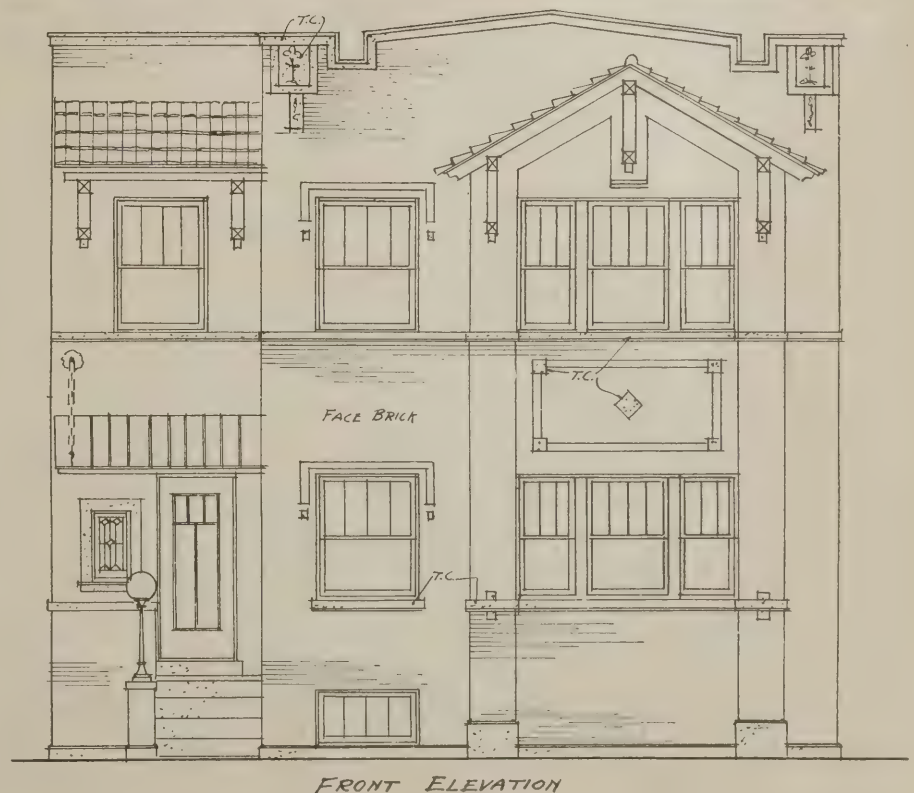
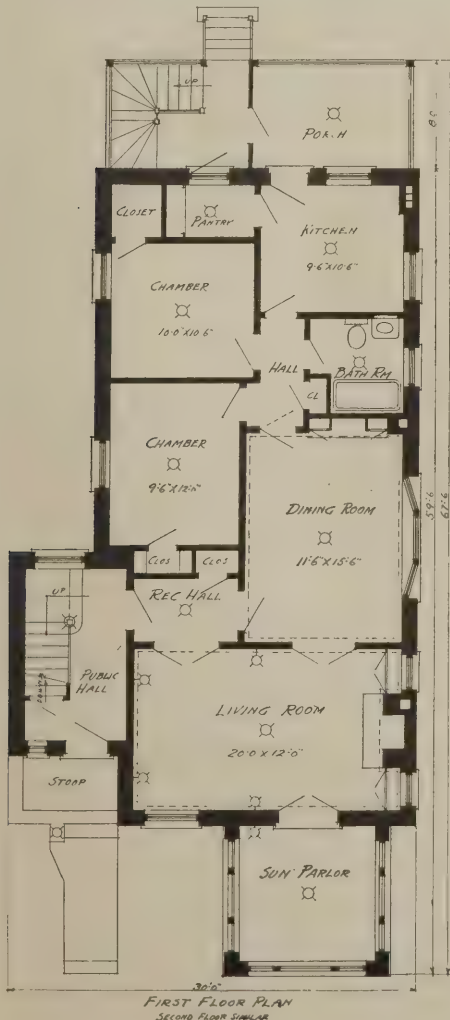
Nos. 1 and 2--Rustic style; Bartlett's Camp, Big Bear Lake, Calif.; photos by Barry's Studio. No. 3--The "Ship Cafe," Venice, Calif.; a house built like a ship, within and without. No. 4--Attractive waiting room at Linwood, Calif.; photos by Maria Willis Fisher, Los Angeles, Calif.

A Typical Two-Flat Building

Edward Benson, Architect

THIS roomy, comfortable and well-arranged two-flat building is representative of the better type of conventional flat buildings. The sun-parlors opening off the living room adds to the space of that apartment with semi-privacy when desired. Ample closet room is provided for, a feature much desired by the housewife. An ample back porch, giving wash-day opportunities, shows a sensible appreciation of housekeeping trials, as also the conveniently placed ice-service from outside to the pantry refrigerator.

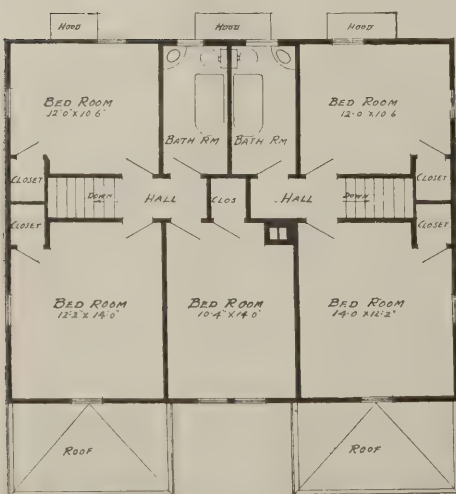
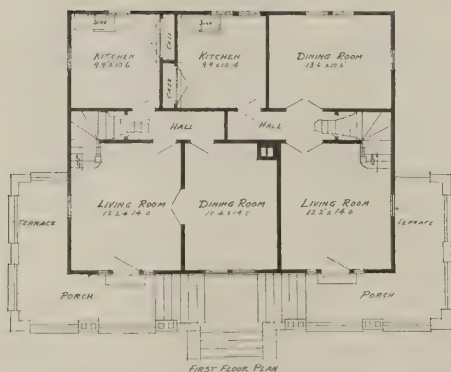
The decorative treatment of the exterior suggests the numerous facilities at the disposal of the builder to set off blank spaces by which he can exercise his taste and ingenuity in placing brick courses in relief and tile facings. The quality of taste in decoration is born in many persons, but it can be cultivated by all builders. Besides, if one is in doubt there are plenty of competent advisors to be obtained.



Innovation In Small House Design



Type 1



Type 1

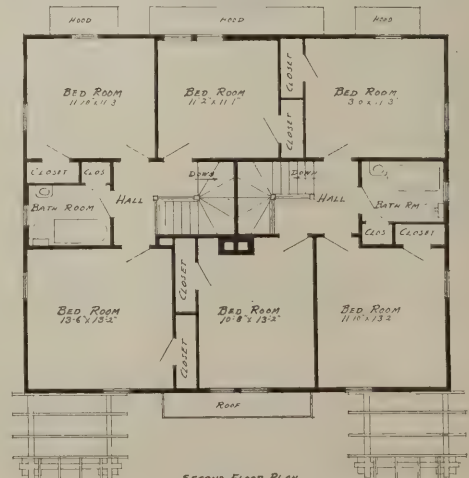
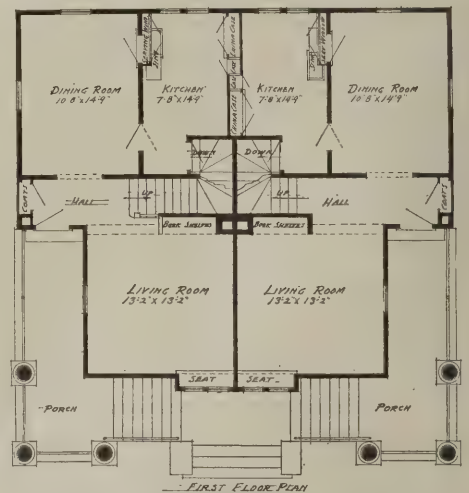
SEVERAL innovations which appear to have more than novelty to recommend them to the attention of persons practically interested in the problem of low-cost house, have been introduced in a row of dwellings erected in New Orleans by Rowland Otis. The problem which Mr. Otis set himself to solve was, in his words, "To build a workingman's house on the minimum width city lot without sacrifice of essentials of good housing—economy of floor space, light, thorough ventilation and privacy."

Each building is of frame construction, and each dwelling or apartment has its own bath and basement. These houses were built in July 1917 and have been continuously occupied.

Type 1 is a duplex house furnishing one 6-room dwelling and one of 5 rooms. It covers a ground area of 36 feet by 28 feet, not including porches. The cost was \$4,500.

Type 2 is also a duplex house, but it furnishes two 6-room dwellings. It covers a ground area of 38 feet by 34 feet, not including front porches. The cost was \$5,500.

Type 3 is a novel adaption of the standard apartment house—it offers variety in a thoroughly practical manner. This house has four apartments of 5 rooms each; covers a ground area of only 54 feet by 27 feet, not including porches and kitchen projection; and the



Type 2



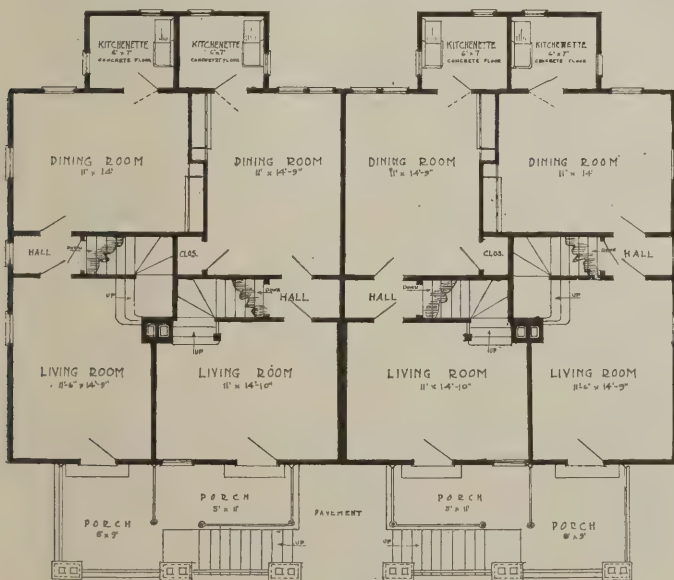
Type 2

cost was but \$8,000, or \$2,000 per apartment. The kitchenettes are compact, but actual use has not shown them to be inconveniently small; neither are they uncomfortably hot, as they are well ventilated by a ceiling register in addition to the two windows. A photograph of this house is not available, but it ad-

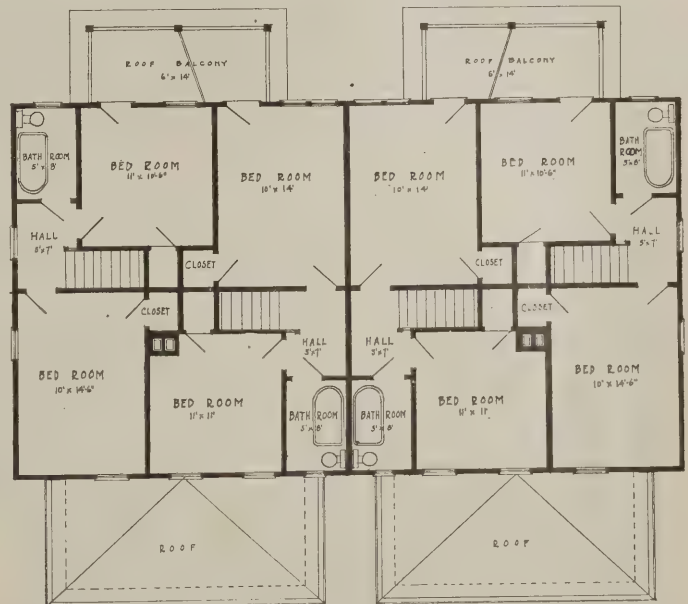
sententials of good housing, light and ventilation, conveniences of arrangement and privacy are these:

First—The departure from the usual type of party wall. The dividing wall between two separate apartments or dwellings does not extend straight thru

obtained great flexibility in the planning. Each room can be made exactly the size desired—neither wastefully large nor impractically small; the halls can be reduced to a minimum; the stairs and closets disposed of in a way to cause the least possible waste of valu-



• FIRST FLOOR PLAN •



• SECOND FLOOR PLAN •

Type 3

heres to the same general type of exterior design.

Describing the distinctive features of these houses, Mr. Otis writes, "The several novel features of these houses—features which tend to reduce the cost without in any way sacrificing the es-

from front to rear as is usually the case. Nor is the dividing wall between the second story located directly over the wall dividing the first story. In each house the apartments or dwellings are, so to speak, dove-tailed one into the other. By this simple device there is

able outside wall space; and, finally, land economized by being able to build a satisfactory house on a very narrow frontage.

Second—The service entrance through the basement direct from the street. This is a more convenient arrangement

than an entrance from an alley, and saving in cost of land and paving.

Third—The insulation of the roof. These are flat tar and gravel which, although the cheapest and easiest repaired, are, ordinarily, insufferably hot in the summer. This objection has been completely overcome by flooring the attic with rough boards, and ventilating the louvres on all sides. On the hottest summer afternoon, there is no difference noticeable between the rooms on the first floor and those directly under the roof. Mr. Otis says, "I believe a thin layer of mineral wool spread on the top of the plastering laths would be better and cheaper than the floor."

Fourth—Ventilation. All windows are casements, besides there is a large scuttle in each upper hall opening into the ventilated attic. The houses being only two rooms deep there is good through ventilation, and there is also a good current of air passing through the scuttles when the sun is heating up the flat roof. In type 3 most everyone supposed the end apartments would prove much the coolest, but experience has proved this idea to be a mistaken one; whatever difference there is, is in favor of the middle ones.

Fifth—Sound Proofing. The partition walls between adjoining bedrooms are deadened as follows: Two rows of studding are used with their faces lined

up about an inch apart; the laths not being nailed to opposite faces of the same stud, the transmission of sound is prevented to a very considerable extent; and there is avoided one of the serious objections to double houses built of wood.

The two principal defects in the type 3, as shown by practical experiences, have been:

First—The crowding of the stairs. By making each house a few inches wider and lowering the heights of the ceiling a few inches, the objectionable winders in the stairs would be eliminated.

Second—The location of the chimney. Placing it in the closet back of the stairs would be an improvement.

Cooling a House

By Rowland Otis

SOME five years ago, I bought the house I now occupy, a single two-frame with slate roof, built on one lot of ground, but with a space of 20 feet on each side, and plenty of windows.

Unbearably Hot

I flattered myself I was getting an unusually cool house; as a matter of fact, it turned out to be unbearably hot.

I went to a dozen different builders with my trouble, but none of them was able to offer anything practical; there were already three of the round iron ventilators in the roof and plenty of windows, and they seemed to know nothing else to be done.

Decided It Was Radiation

After puzzling over the matter for a while longer, I convinced myself that the heat of the upper floors was caused by radiation from the roof to the plaster ceiling and I decided to lay a rough floor in the attic with some odds and ends of old lumber I happened to have on hand. There was an immediate and decided improvement, and, later on, when I replaced the windows in the gable ends by ventilating slats so the wind could blow through the attic from end to end, there was a further improvement; and now, the rooms on the second floor were no more uncomfortable than those on the first.

The house was still warm, though; even when there was a good breeze blowing outside, there was very little air drawing through any of the rooms.

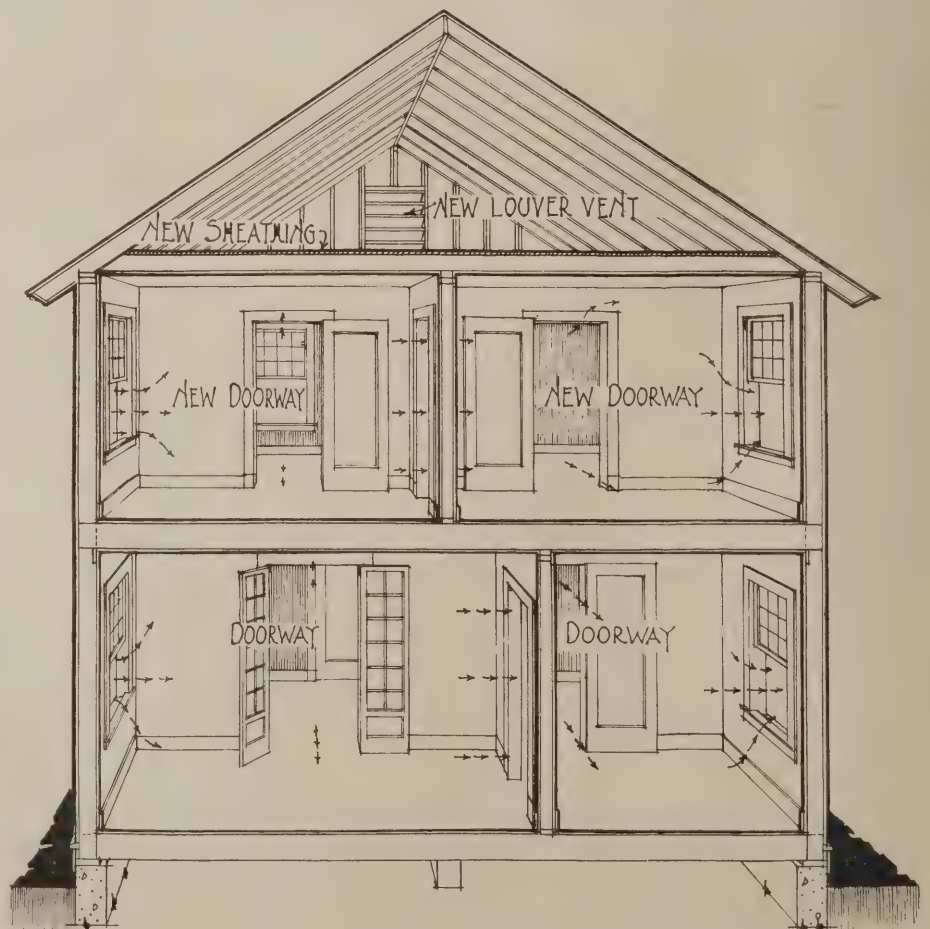
I turned my attention to the windows on the end of the house, with the idea of persuading a little of the air which blew through the alleys to enter these windows or draw through the house instead.

My first efforts proved surprisingly

successful, so I continued on along the same line—cutting two more windows in the end of the house and a door between two of the bed rooms so as to permit a free passage of the air from end to end. With these changes, the good work was complete; and, now, whenever there is any breeze at all, no matter from which direction it comes

there is always a little current drawing through the house.

There were other changes, but these were unimportant and special to my particular case—the two things that did the work were the insulation of the roof, and the through ventilation from front to back. The last named is of course practicable for shallow houses only.



Steel Girders for Store Buildings

By Jim T. Pomeroy

THE accompanying diagrams and data for steel girders have been carefully worked out for the use of contractors who work from their own plans. They may be used with safety—always remembering that the dimensions are maximum ones. The data must not be juggled. Remember an increase of two

bottom of the girders, making a neat job and giving outside fire and weather protection.

The ends of the combination girders should rest on the wall piers a distance equal to the girder depth, that is, a 12-inch girder should be 2 feet longer than the clear span. The plate girders should

ceed 14 feet in height, and should be bolted to the girder above and to the foundation below.

In types "C" and "D" if it is desired to keep the store floor space free from columns, it will be necessary to use steel girders at intervals across the store ceiling to carry the floor joists above. This framing is not economical, as the girders must carry the entire second floor, as well as a large portion of the third floor and the roof, the loads from which are transmitted through the partitions. As each girder is formed of two I-beams, the use of deeper

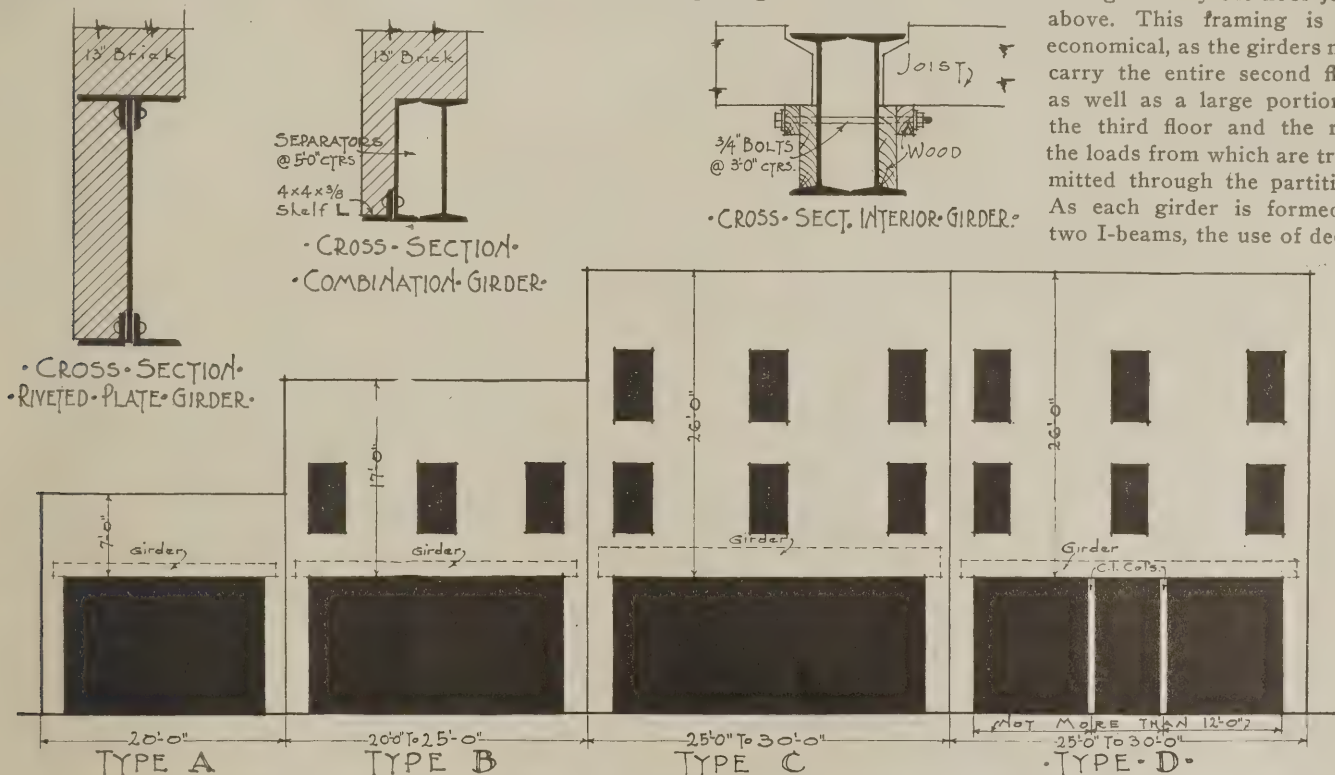


TABLE I.

DATA FOR FRONT GIRDERS			
TYPE	CASE	DESCRIPTION	MATERIAL
A	1	COMBINATION GIRDER WITH SKELF ANGLE	ONE 10" I 25* ONE 10" L 15*
B	1	DITTO	ONE 15" I 42* ONE 15" L 33*
B	2	RIVETED PLATE GIRDER	ONE WEB PLATE 24x3/8 FOUR FLANGE Ls 5x3 1/2
C	1	DITTO	ONE WEB PLATE 30x3/8 FOUR FLANGE Ls 6x4 1/2
C	2	DITTO	ONE WEB PLATE 30x1/2 FOUR FLANGE Ls 6x4 3/8
D	1	COMBINATION GIRDER WITH SKELF ANGLE	ONE 12" I 31.5* ONE 12" L 20.5*
D	2	DITTO	ONE 15" I 42* ONE 15" L 33*

IN CASE 1 THE FLOORS & ROOFS ARE ENTIRELY SUPPORTED BY SIDE WALLS.
IN CASE 2 THE FLOORS & ROOFS ARE PARTLY SUPPORTED BY FRONT GIRDER.

TABLE II.

DATA FOR INTERIOR GIRDERS.. FOR TYPES C & D ONLY			
CTR. TO CTR. OF GIRDERS	SIZE OF I-BEAMS FOR EACH GIRDER	SIZE OF BEARING STONE	WIDTH OF PILASTER
10'-0"	TWO 18" I 55*	16 x 16 x 10	17"
12'-0"	TWO 18" I 60*	18 x 16 x 12	21"
14'-0"	TWO 20" I 65*	20 x 16 x 14	21"
16'-0"	TWO 20" I 70*	24 x 16 x 16	25"

feet in span may mean 8 or 10 tons difference in carrying capacity.

Strength and simplicity are combined in the girders shown. The plate girders have but two rows of rivets as flange plates and stiffeners (short, vertical angles riveted to the web) have been avoided.

The brickwork can be started at the

have a bearing at each end equal to one-half their depth. No bearing stones are required.

In type "D" the use of columns to shorten the span allows a smaller girder. Cast iron columns are recommended. They should be 6 inches in diameter and have a one-inch shell; may be rectangular or round in section; should not ex-

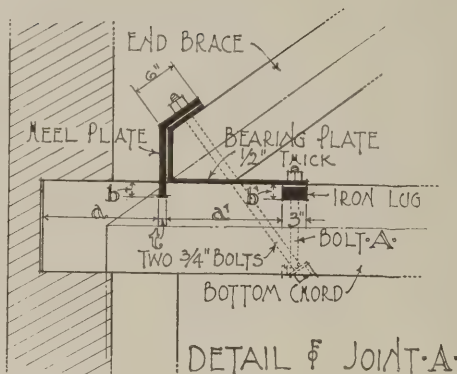
single beams would be more economical, but their appearance would not be good. The ends of these girders should rest on tough bearing stones which in turn should rest on brick pilasters projecting 4 inches from the 1'-inch wall. Table II gives other data on these interior girders.

It is assumed in all cases that the upper floors may be used for living apartments, offices or public halls; that the front walls above the girders are 13 inches thick; that the maximum span of any joist resting on girders is 16 feet, and that the upper windows may be of any number, type or location.

Notes on Wooden Trusses

THE trusses considered are those adapted to flat-roofed buildings. It is assumed that they are uniformly loaded; that they support a 5-ply felt and gravel roof and a lath and plastered ceiling; and that long-leaf pine or Douglas fir timbers are to be used. Spans exceeding 60 feet have not been considered as such conditions usually require more complicated analysis.

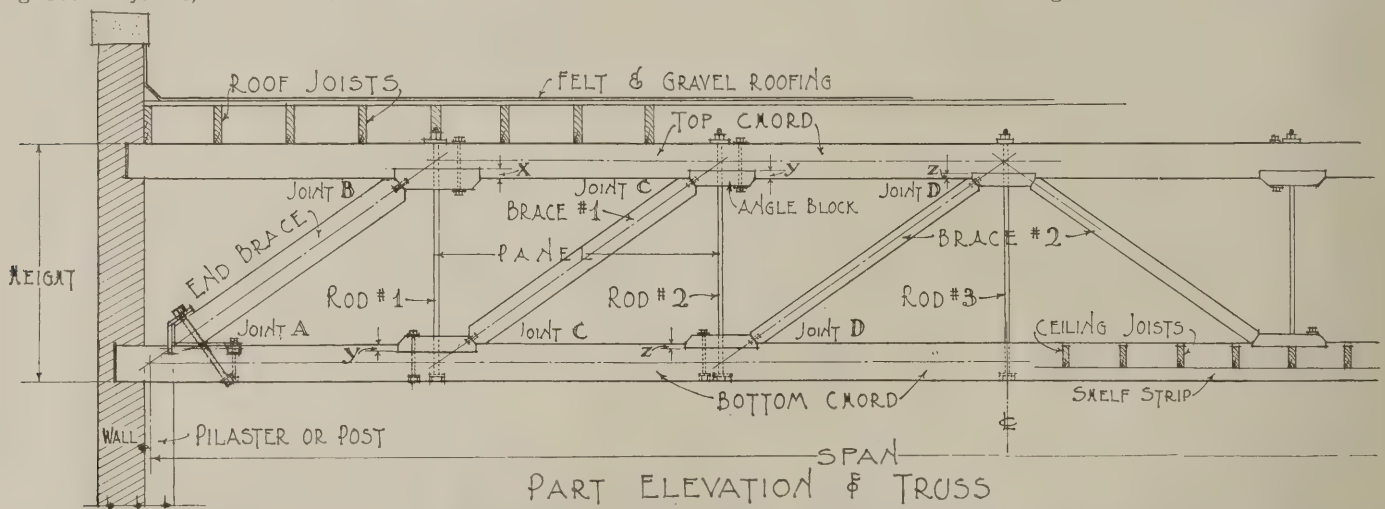
The accompanying table should fill a long felt want. It gives sizes for both solid timbers and for built-up ones, together with important data for building secure joints, etc. Standard sizes



thruout this member to reduce the number of plank joints to the minimum and have the necessary ones well separated in the direction of length.

There are many methods for making truss joints. All have drawbacks, structural or otherwise, but the joints selected require less cutting away of effective material than do many others, and they are easily built. Other types may be used if you are sure of your ground. All bolts should be accessible for tightening from time to time, and all seats, bearings, etc., should fit closely.

The angle blocks are of select white



CONSTRUCTION DATA FOR 6-PANEL HOWE TRUSSES																	
CONDITIONS			SIZE OF MEMBERS					RODS & WASHERS			DIMENSIONS, ETC., FOR JOINTS						
SPAN	SPACING	HEIGHT	TOP CHORD	BOTTOM CHORD	END BRACE	BRACE #1	BRACE #2	ROD #1	ROD #2	ROD #3	a or a'	b	b or b'	BOLTS A	DAP X	DAP Y	DAP Z
40'-0"	12'-0"	5'-8"	8 x 8 FIVE 2 x 8	8 x 8 FIVE 2 x 8	8 x 6 FIVE 2 x 6	6 x 6 FOUR 2 x 6	6 x 4 THREE 2 x 4	1 1/4 5 x 5 x 1/2	3/4 3 x 4 x 1/2	3/4 3" ROUND	12"	3/4"	1 1/4"	TWO 3/4	2"	1 1/4"	3/4"
	16'-0"	5'-10"	8 x 10 FIVE 2 x 10	8 x 10 FIVE 2 x 10	8 x 8 FIVE 2 x 8	6 x 6 FOUR 2 x 6	6 x 4 THREE 2 x 4	1 3/8 6 x 6 x 3/8	7/8 4 x 4 x 1/2	3/4 3" ROUND	15"	7/8"	1 3/4"	THREE 3/4	2 1/2"	1 5/8"	3/4"
	20'-0"	5'-10"	10 x 10 SIX 2 x 10	10 x 10 SIX 2 x 10	10 x 8 SIX 2 x 8	6 x 6 FOUR 2 x 6	6 x 4 THREE 2 x 4	1 1/2 6 x 8 x 3/4	1 4 x 5 x 1/2	3/4 3" ROUND	15"	1"	1 3/4"	THREE 3/4	2 3/4"	2"	3/4"
50'-0"	12'-0"	7'-0"	8 x 10 FIVE 2 x 10	8 x 10 FIVE 2 x 10	8 x 8 FIVE 2 x 8	6 x 6 FOUR 2 x 6	6 x 4 FOUR 2 x 4	1 3/8 6 x 6 x 3/8	7/8 4 x 4 x 1/2	3/4 3" ROUND	15"	7/8"	1 3/4"	THREE 3/4	2 1/2"	1 1/2"	3/4"
	16'-0"	7'-0"	10 x 10 SIX 2 x 10	10 x 10 SIX 2 x 10	10 x 8 SIX 2 x 8	6 x 6 FOUR 2 x 6	6 x 4 FOUR 2 x 4	1 1/2 6 x 8 x 3/4	1 4 x 5 x 1/2	3/4 3" ROUND	15"	1"	1 3/4"	THREE 3/4	2 3/4"	2"	3/4"
	20'-0"	7'-2"	10 x 12 SIX 2 x 12	10 x 12 SIX 2 x 12	10 x 8 SIX 2 x 10	6 x 6 FIVE 2 x 6	6 x 4 FOUR 2 x 4	1 3/4 8 x 8 x 7/8	1 1/8 5 x 5 x 1/2	3/4 3" ROUND	18"	1"	2"	THREE 7/8	3 1/4"	2 1/2"	1"
60'-0"	12'-0"	8'-4"	10 x 10 SIX 2 x 10	10 x 10 SIX 2 x 10	10 x 8 SIX 2 x 8	8 x 6 FIVE 2 x 6	6 x 4 FOUR 2 x 4	1 1/2 6 x 8 x 3/4	1 4 x 5 x 1/2	3/4 3" ROUND	15"	1"	1 3/4"	THREE 3/4	2 1/2"	1 3/4"	3/4"
	16'-0"	8'-6"	10 x 12 SIX 2 x 12	10 x 12 SIX 2 x 12	10 x 8 SIX 2 x 10	8 x 6 FIVE 2 x 6	6 x 4 FOUR 2 x 4	1 3/8 8 x 8 x 7/8	1 1/8 5 x 5 x 1/2	3/4 3" ROUND	18"	1"	2"	THREE 7/8	3 1/4"	2 1/4"	1"
	20'-0"	8'-8"	10 x 14 SIX 2 x 14	10 x 14 SIX 2 x 14	10 x 10 SIX 2 x 12	8 x 6 FIVE 2 x 8	6 x 4 FIVE 2 x 6	1 7/8 8 x 8 x 7/8	1 1/4 6 x 6 x 1/2	3/4 3" ROUND	18"	1 1/8"	2"	THREE 7/8	4"	2 3/4"	1"
The Spacing Refers to the Distance between the Centers of Trusses.			The Upper Figures of Each Division Refer to the Dimensions of Solid Sticks; the Lower Figures Refer to built-up Members.					The Upper Figures Refer to the Diam. of Rods; the Lower Figures are for Washers.			SEE DETAIL OF JOINT A.				SEE JOINT B.	SEE JOINT C.	SEE JOINT D.

of lumber may be used for the built-up members, as the 3/8-inch variation between the nominal and actual size of lumber has been accounted for, as have the bolt holes and other like details. Guesswork has not entered into the determination of sizes nor proportions—be fair with them and they will be fair with you.

For built-up members use as long

lengths as can be obtained; spike the layers together from the middle out; and secure the ends of each plank with two 3/4-inch bolts placed not nearer than 6 inches to the edge of any plank. Finally, bolt the layers together every 2 feet, with 3/4 inch staggered bolts. Avoid having the end of any layer occur between the two middle panels of the bottom chord. In fact, use special care

oak, set with the grain parallel to that of the chord. Their width equals that of the chord; their length equals twice their width; and their depth equals at least twice the depth of the dap. A 5/8 inch bolt is used to hold them to their seat, and the braces are doweled to them.

The shoe for the connection of the end brace to the bottom chord is made

of two plates and a lug; it can be made up by any good blacksmith. Each plate is in one piece and has a width equal to that of the chord. The lug extends entirely across the top of the chord, but it may be built up of several layers. All the members are brought into close contact by the bolts. This joint carries more load than do the intermediate ones and careful workmanship is required to get good contact between the

wood and iron at points b and b'—see detail.

The tabular sizes of the timbers are slightly larger than some other tables require, but the difference is due to the fact that the accompanying table is based on resting the joists directly on the chords without using purlins. The roof slope may be given by false work built on the top chords. This will simplify the construction by keeping all of the trusses the same height.

One reason for the general use of iron vertical rods is due to the well-known tendency of wood to split along the grain. These vertical members are in tension, that is, they tend to pull away from the chords. To secure such a wooden vertical member to the chords would require several times as much metal as is contained in the iron rods, not to speak of the extra work and the excessive size of the wooden members.

How to Obtain Dry Basements

By John Y. Dunlop

ONE of the greatest difficulties which the builder has to contend with is that of ground water in low lying land.

Every site must be judged by itself, as the nature of the ground varies even in a short distance.

All damp soil is made drier, and clay soil, by reducing the evaporation, is made warmer by drainage.

Sandy and gravelly soils are naturally drier and warmer than clay, and on account of their openness, water rapidly sinks through them and they contain a considerable quantity of air.

Ground Air to Be Feared

In these the fluctuation of ground water and consequent exhalation of ground air is more to be feared than dampness.

Where a site is to be drained with sub-soil drains it is usual to lay the drains in the direction of the natural fall of the ground, and if the drains are arranged to pass under the building, as shown in Fig. 1, the depth of the foundations or the depth of the basement regulate the depth which the drains are to be laid.

In the case of the building shown on the block plan, the lowest point in the concrete foundation was three feet six inches below the ground level, and in this particular case the highest point of the drain was fixed at sixteen inches below that level.

This sixteen inches allowed for the working of the ground plus the fall of the drain forward to where it passed under the building.

Fig. 3 shows a section of one of the trenches and drain pipes. These pipes are laid with open joints. The pipes are D-shaped and are three inches inside.

In laying the pipes where the branch drain meets the main drains, the tile pipes are cut to fit into one another, something in general like a mitre joint on the top and a butt joint on the bottom.

Before filling in the trench a couple of large stones are put over the joints. These are for a double purpose, to maintain the pipe in position during the filling-in operations, and to allow the soil water to trickle through the joint into the pipe.

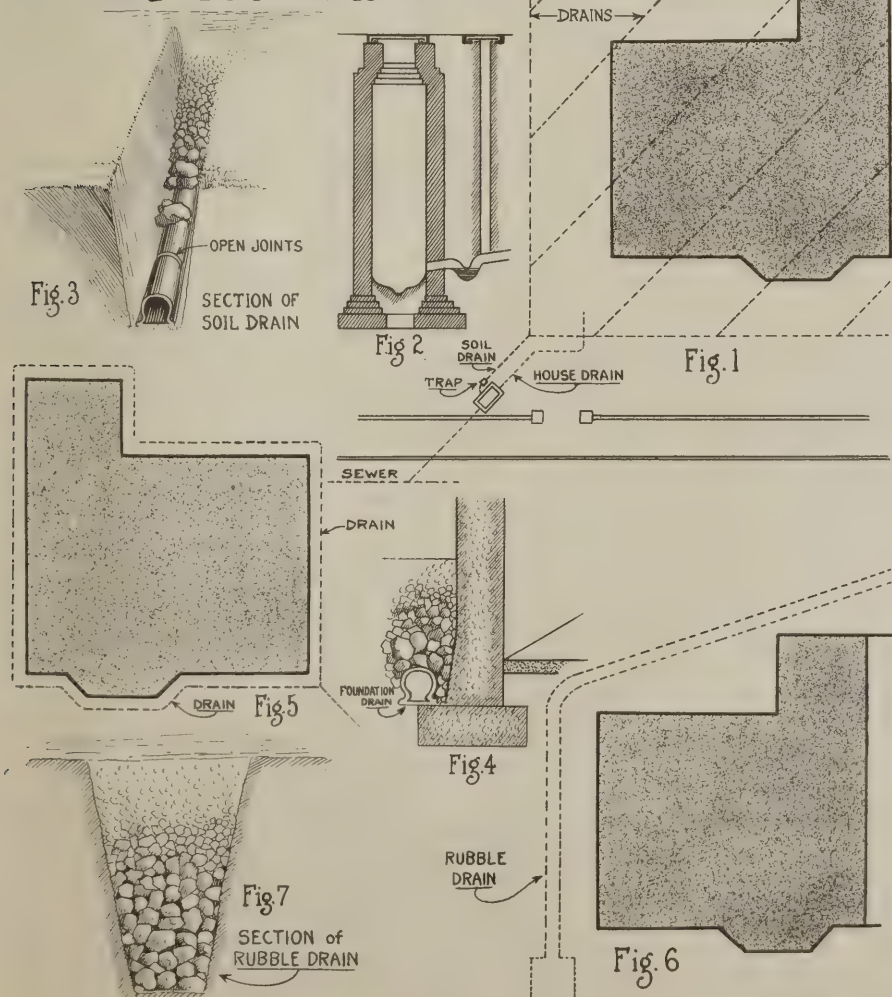
It is always better to provide pipes for sub-soil drainage, as these permit the water to flow off more rapidly and are less liable to choke than any other system.

Kinds of Pipe

Of course, there is just this disadvantage with the unsocketed pipe shown in Fig. 3, that they are difficult to keep in position, both horizontally and vertically, during the filling-in of the drain.

To overcome this, half collars four inches long are sometimes placed under the pipe, or pipes with a half faucet

HOW TO INSURE DRY BASEMENTS



formed on the lower part of the pipe are only used.

The last method is the best and ensures an unbroken waterway.

Whatever kind of pipe is used, the trench above the pipe should be filled in for a considerable depth with broken stones and then with soil.

In all cases the depth of the drains should be as great as possible, but consideration must be given to the outfall, and very often the amount of money allowed for the drainage of the site regulates the depth.

Deep drains may be placed wide apart, but shallow drains should be much closer.

Distances Depend on Soil

Again, the stiffer the soil the closer the drains must be, and for ordinary examples of work in clayey soil the distance apart should be nine feet, in loamy soil fifteen feet, and in sand and gravelly soil the width may be increased to thirty feet.

The outlet for the ground water in Fig. 1 example is into the house drain, the connection being made on the house side of the disconnecting trap.

Fig. 2 shows the connection which is disconnected by a trap and air shaft.

In the country the sub-soil drains may be carried to the nearest stream, or if that is too far a distance and there are objections to the surface water being

taken into the house drains, very often a large rubble pit is formed into which the end of the drain is led.

This arrangement is not always ideal, because although the water may be drained clear of one site, in course of time it may rise to trouble the adjoining proprietor if he has not taken the precautions to have his site drained.

Sub-soil Drains Aid Old Houses

Sub-soil drains are very seldom found under or around old houses, and in damp situations many an old house has been cured of dampness by an efficient system of ground drains.

Of course it does not suit everyone who may own an old house to have the whole of the ground opened up, but a very good plan both for an old house and a new house is to have a sub-soil drain laid round the house.

This drain should be laid with open joints as in the last example, and should be filled in immediately above with broken stones as shown at Fig. 4.

The level of the drains should be below the level of the basement floor and the drain should be laid with a fall towards the outfall.

Where there is no desire to open up the ground for sub-soil drains or to open up the outside of the foundations, the next best is a rubble drain.

Rubble or French Drain

Fig. 6 shows the arrangement of a

rubble drain, or as it is sometimes called, a French drain.

The trench is cut across the back of the house and down to where it is discharged in a deep hole prepared to allow the water to drain away.

This hole, or sump, as it is called, is filled up in much the same way as the rubble drain, large stones at the bottom with a reduced size toward the ground level.

The distance of the trench, as shown at Fig. 7, from the house will depend on circumstances, but the surface of the ground should be level between the drain and the house.

The trench when cut at the back of the house should be as deep as the foundations of the basement and is cut with a fall towards the discharging end of the drain.

There are many other ways of preventing the ground water from finding its way into the house, but I am sure there are no more economical and satisfactory methods than those shown.

There are various ways and means also of draining water off before it reaches the fabric of the house, and of course if an open drain area could be formed round the walls of the house with the bottom of the area as low as the foundations of the basement, that would prevent the water reaching the foundations.

Flat Tin Roofing Suggestions

By L. S. Bonbrake

A GENERAL knowledge of all the trades entering into diversified building construction will make a contractor a builder in the fullest sense. This advantage must always come to the front when the better class of structures are in consideration, as the builder has the confidence of knowing how and the ability to make suggestions, and give advice in all the details pertaining to the work.

In the use of sheet metal in building I offer suggestions that some builders may find useful and first direct attention to the useless and old-fashioned method of nailing 2x4 studs at the ends of a flat pitched tin roof to prevent water from running over and staining or streaking the cornice.

Have the tinner finish the gable end or ends, as shown by Fig. 1, by using all metal as illustrated. Form a strip of tin, cut the necessary length, back upon itself 2 inches, then form this, fold forward, 1½-inch, giving the outline No. 2 which, when straightened to a right angle produces the projection as

shown at eave Fig. 1, by which you will note 1 inch is provided for nailing to the gable fascia, or sheeting, with a double fold extending above the roof for cornice protection of ½ inch. The height may be increased by adding to the first fold made as desired.

This method saves tin, all the lumber, and a great amount of tedious work lining the 2x4 stud, with a far neater appearance—which should recommend it all around.

Eave Flashing

Another wrong practice is used where a flat tin roof abutting the side of a dwelling and flashed under the eave of the house is laid piece by piece from the bottom of the roof, and laboriously and unskillfully inserted under the edges of the shingles above (with the workman laying flat on his stomach), in order that water shall not run into or against the last seam. The practical method is shown by Fig. 3. A strip of 20-inch tin is seamed and soldered together the required length to reach from gable to gable, and the back of

the strip tongued up the height required, indicated by flash, Fig. 3. The front of the tin strip is formed at little more than a right angle, ¾-inch wide, under which the nails are driven for completion. When the shingles or roof of the main house come down so close to the sheeting for tin, so that it cannot be hooked under their ends, then it becomes necessary to slide the whole length into place from the open end most convenient, as illustrated by flash "C." This may be done at any time when help can be most conveniently procured.

The body of the roof is laid from the bottom in the usual way, laying the sheets the 20 or 28-inch way up the roof as it may measure for ending an inch under the flash strip without waste, as at B. When all the body of the roof has been laid with the top course under the flash an inch, the latter is nailed down onto the sheets as at E, after which the entire ¾-inch edge is malletted down tight and smoothed over the nail heads, and

solder-sweated into both edges thoroughly. The back of the flash "D" may be nailed if at all convenient to get at. If not, when tonguing up, it should not be quite in line with the angle of the roof. It should tip back slightly and then when forced up from the bottom, it will hug the fascia, or lining, under the shingles and will answer without nailing except at the ends where it can be gotten at.

Fig. 4. illustrates a simple device for nailing under the eave or other difficult places to get at, such as box gutters, etc. A tube, the size of the nail head to be used, is fitted with a solid drive bar. The tube may have a slight flange hammered onto the drive end, and the bar be provided with a head or nut, on its outer end: this is to prevent the tube and drive bar from becoming separated. The nail is inserted as shown. The device allows the nail to be driven back of a higher front, and is frequently found almost indispensable around a new building.

Eave Finishes Prevent Drip

The up-to-date contractor having metal roofing done should see that the eave edges are properly finished. The old manner of projecting the tin over the eave, malleting it down and nailing, should not be allowed.

The form for flat seam tin roofing eave finish used by progressive sheet metal workers is illustrated by Fig. 5.

Strips of the roofing material are cut $1\frac{1}{2}$ inches wide (scrap) or the width of the sheet, in sufficient number to equal the length of the eave, allowing for lap. The folding brake is set at $\frac{1}{2}$ inch and the strips are formed at a right angle, allowing the drop side of the strip a width of one inch, which will slightly more than cover the sheeting edge, over which it is nailed. The seam fold of the roofing sheet is hooked over the $\frac{1}{2}$ -inch edge, where it is malleted tight and smooth.

Cleating flat roofing sheets has become obsolete, owing to the tendency of workmen to nail too far back on the cleat, so when expansion and contraction straighten the cleats out the sheets become loose and then rattle and buckle, bursting the seams and making leaks. Nail in the corner, in the center of the 20-inch way; space the 28 inches with two nails, large headed, tinner, or galvanized, soak the solder in good by sweating and there will be no going back.

For Standing Seam Tin Roofing

The eave finish is formed from the body of roof strips by first snipping into the sheet, 2 inches from its end, equal to the width of the flanges to be formed

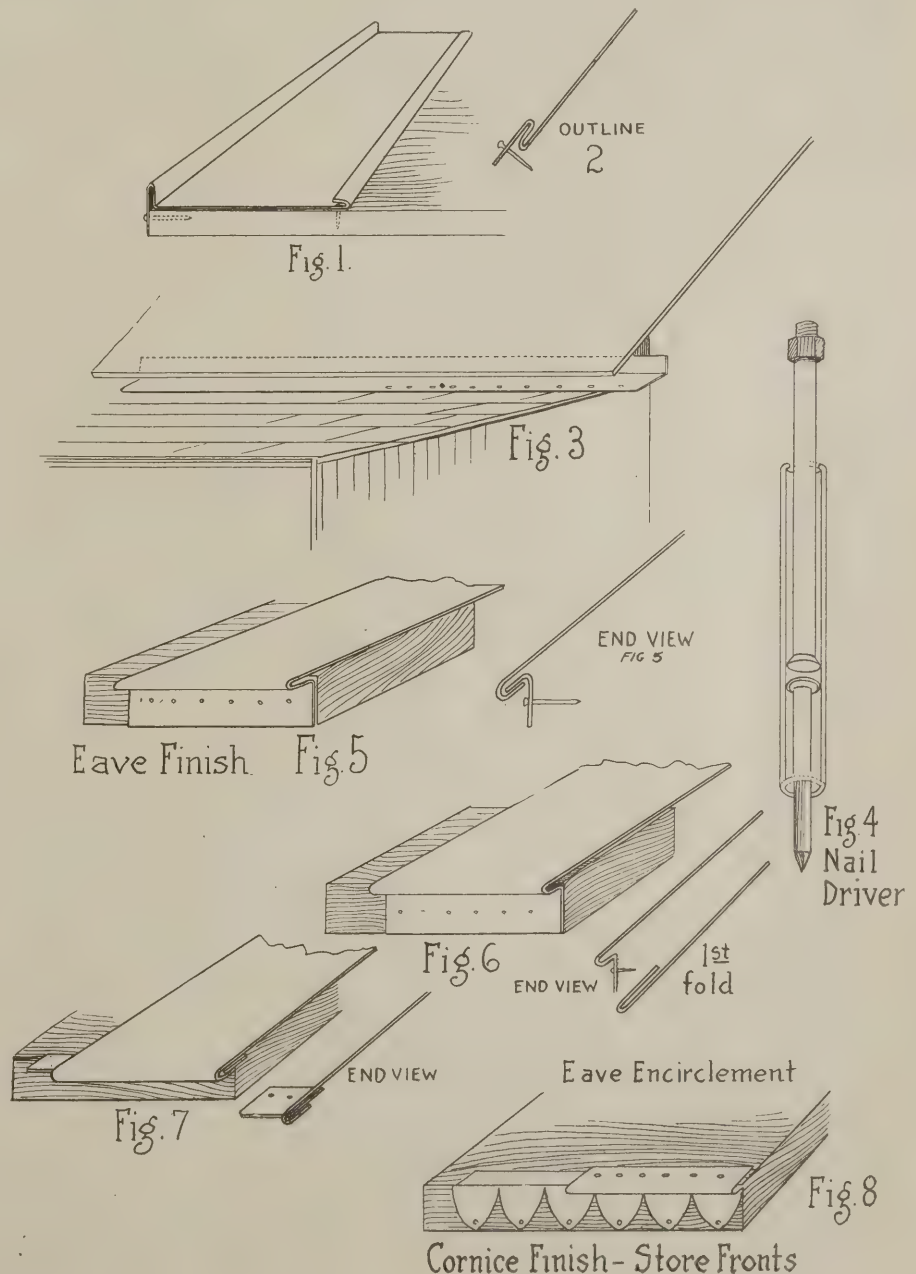
on either side for the standing seams. Pull back the lower end of the sheet upon its self, forming back the end 2 inches flat; then tongue forward at right angle 1 inch, and the fold is made for nailing as shown by the end view.

Fig. 7 illustrates a finish for the heavier grades of pressed seam, V crimp, cap seam, and other methods for roofing with galvanized iron. It is simply a strip $1\frac{1}{2}$ inches wide of No. 24 galvanized iron nailed straight along the eave sheeting board over which the end of the roofing is hooked and pounded down tight.

These devices give a projection of the metal beyond the edge of the eave board, preventing drip and consequent stain and streaks. The water is also diverted from passing over the nail heads, which is desirable to avoid.

Finish for Ledges

The finish for ledges over store fronts, large windows, etc., when something different is wanted, as illustrated by Fig. 8, was originated by the writer some years ago, and has given satisfaction. The scalloped strip is cut 2 inches wide, and a line drawn straight through $\frac{3}{4}$ inch. From one edge $1\frac{1}{8}$ inches points are slipped off, and the convex points are scribed alternately from these points and cut out. Then the strips are formed at a right angle on the line and tacked in place after which a beaded strip is nailed over it, having a back edge formed into which the body of the covering may engage for seaming. As bead seam is nailed under its back fold the nail will pass through the first strip, securing both firmly in position. The work has an attractive appearance and avoids drip running down the moulding.



Creating a Village

Villages and Towns No Longer "Just Happen." They are scientifically designed—and the Result is Harmony, Beauty and Utility

THE new village of Perryville, Maryland, is one of the most interesting of the housing developments of the past year. It was planned under the direction of the Industrial Service Section of the U. S. Ordnance Department for the Atlas Powder Company. Perry R. MacNeille, of Mann & MacNeille, New York, was in charge.

The site of the village as shown in the accompanying town plan is especially endowed by nature in the way of natural features, lying as it does on the gently sloping banks of the broad Susquehanna River, approximately forty-five miles west of Philadelphia, and thirty miles northeast of Baltimore, with the dark

Other recreation grounds have been designed for the west end of the village suitably planted with shrubs and trees, and are large enough for public gatherings, such as band concerts, etc.

Along the top of the bluff, between the road and river, walks have been laid out leading to and from the welfare building in the center. The existing foliage has been augmented by the planting of additional shrubs and trees. Suitable shade trees, planted forty feet apart, have been designed for the streets.

The main aim of the planting and parking scheme is to tie together the natural foliage that exists by connecting walks and planting and in a way to form a unity

shingles. The buildings which are being constructed are as follows:

Approximately 250 houses varying from 4 to 7 rooms, with all modern improvements, including fireplaces, large verandas, special exterior entrances leading to the kitchen and cellar.

Six boarding houses of type shown in accompanying illustration.

One club house shown in accompanying illustration.

Description of Individual Buildings

The individual dwelling houses as shown in various illustrations are of modern colonial type, each house being placed on a sufficiently large tract of



Plan of the New Village of Perryville, Maryland

green foliage of an oak forest in the back ground.

Equally dividing the village in half, is a partially wooded dell, on the edge of which stands an old mansion house surrounded by fine old button wood and locust trees, with here and there groups of magnificent boxwoods of a hundred years growth. The Manse has been remodelled into a house for the superintendent, and the grounds kept intact.

As this section is unsuitable for building purposes, it has been laid out as a park and grounds for the public school, which has a commanding site overlooking the village and river.

of design with the welfare building at the center.

In the general design of the street layout attention was given to lay out as many streets as the conformity of the land would allow, at right angles with the river, thus allowing vistas from the house down to the water, while the avenues run parallel to the mill, curving as the contour of the land demands.

Most of the buildings in this village are of frame construction, a few houses being of brick veneer, having white pine for all exterior mill work, and interior trim also of pine and white wood. The exterior walls are covered with novelty siding of pine, and roofing of cedar

ground to give space for planting and gardening.

In the design of the dwelling houses at Perryville, particular attention was paid to the interest of the housewife. All kitchens are of ample size and arranged for cross ventilation with windows on two sides. The designs allow easy entrance from kitchen to the dining room and the nature of the location of the houses is such that from almost every kitchen there is an interesting outside view. All houses in Perryville are of individual type, at no place separated by less distance than sixteen feet. With practically every house there is a plot of land containing at least 5,000 square feet.



School Building at Perryville

Following is an outline specification of a typical house at Perryville:

Studs with Building Paper and Novelty Siding on the Exterior and Wall Board on the Interior

Masonry—Excavation to be performed for walls, piers and footings to the depth indicated on the drawings.

Footings of stone concrete 6" thick and 12" wider than the masonry work above.

Foundations for the excavated portion of the building shall be of concrete walls 8" thick on concrete footings 6" thick

Carpentry—Framing of the entire building above the foundation shall be done with sound lumber purchaseable in the local market. Where not called for to be contrary on the drawing, the size of the lumber shall be as follows:

Floor beams, 2 x 6"—16" on center.
Ceiling beams, 2 x 4"—16" on center.
Rafters, 2 x 6"—18" on center.
Studs, 2 x 4"—16" on center.

Sills and girders built up 2 x 6" pieces to thickness required.

Under floors shall be provided throughout the first and second story

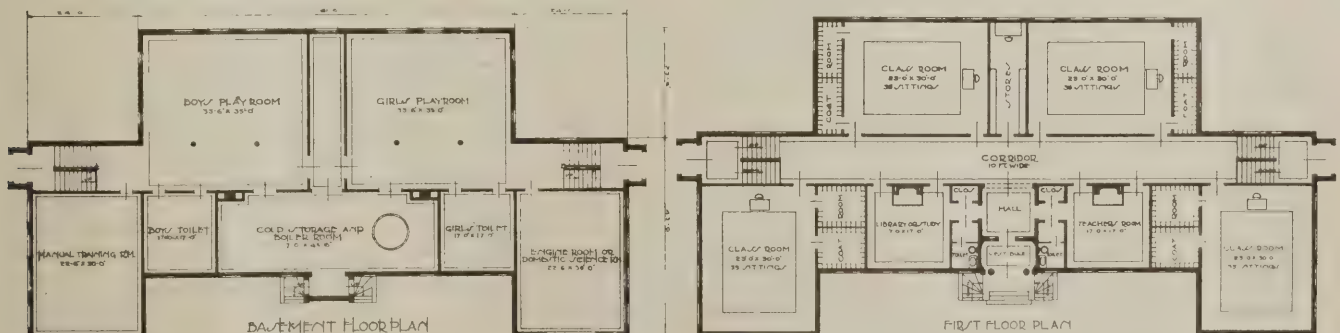
pine or fir. They shall be five cross panel doors of stock design.

Interior and Exterior Mill Work shall be of cypress or pine throughout as the contractor may prefer

Roofs shall be covered with cedar shingles 16" long and exposed 5½" to the weather.

Finished floors shall be of oak ¾" thick throughout the master's portion of the first floor and of N. C. pine throughout the remaining portion of the first floor and throughout the entire second floor.

Wall Board shall be used against all



and 20" wide. For the unexcavated portion of the building the foundations shall consist of 8" x 8" concrete piers with curtain walls between same of expanded metal lath covered on both sides with cement mortar 1" thick, total thickness of curtain wall approximately 2".

Chimneys to be of brick lined with terra cotta flue linings.

and shall be of ¾" ship-lap pine boards.

Exterior wall studs shall be covered on the exterior with building paper and novelty siding of pine, showing about 6" to the weather.

Exterior doors shall be 1¾" thick of pine or cypress, panelled and glazed.

Interior Doors shall be 1½" thick of

interior wall surfaces and ceilings throughout the entire first and second story of the building. This wall board shall be in quality similar to Adamant plaster board or other approved manufacture equally good. This board shall be held in place by wooden battens ¾" x 1½" and arranged so as to form panels, as shown on the drawings.



Community Club Building at Perryville

Finished Hardware for doors and windows as well as the rough hardware necessary for the framing of the building shall be provided and set by the contractor.

Flashing shall be done with K. X. tin in valleys and chimneys, over the tops of windows and wherever necessary to

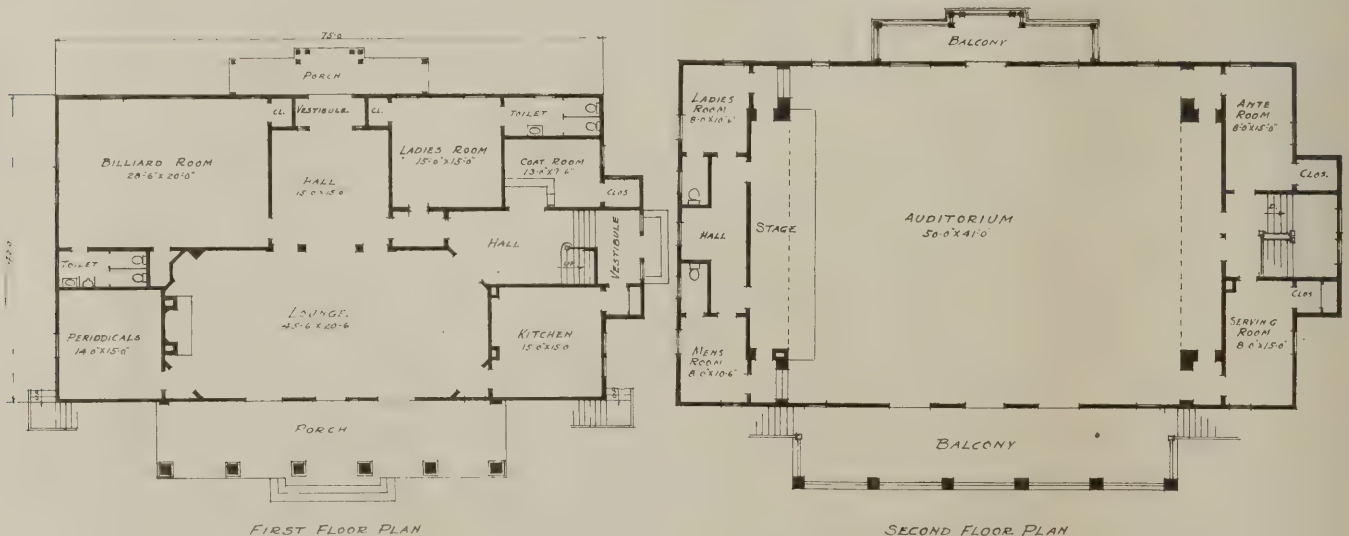
Heating: The contractor shall provide and install a hot air heating apparatus with the collar and wall pipes, iron register boxes, wooden cold air duct, a furnace of a manufacture to be approved by the architects.

He shall install the heating system in accordance with the architect's layout

entrance. This apartment is for the use of the caretaker of the building. Central lavatories have been installed at convenient points. This boarding house can be operated by a small family.

The Club house, illustrated herewith, is a building which may be used as a community center. It is equipped on the first floor with a large lounge and periodical room, billiard room, retiring room, coat closets, lavatories and kitchen. Meals are usually served in the lounging room, or in the case of a large assemblage the large auditorium on the second floor is used for a banquet or dining room. The second floor is largely taken up with the auditorium, stage and dressing rooms for men and women. There have also been provided ante-rooms and a serving room in case a banquet or dinner is served in the auditorium. In general this is typical community building rather than a club house and no living quarters are provided either for guests or servants.

The School building as shown in accompanying illustration is a four room unit with necessary cloak rooms, library, teachers' rooms and play rooms for boys and girls, together with manual training shop. This building is one story in height but is so designed that additional class rooms may be added by the construction of wings to the present build-



make the building weather and water tight. Cap flashing to be used against masonry construction.

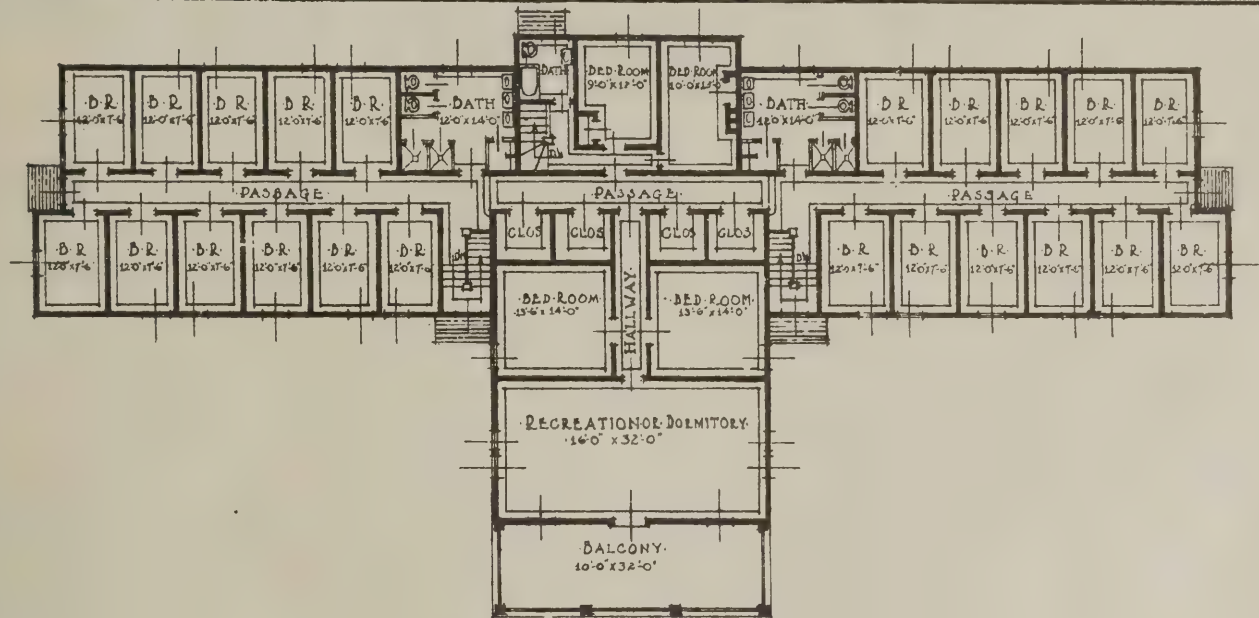
Painting shall be done on all exterior woodwork with two coats of lead and oil paint, as per sample approved by the architect. Interior finished woodwork throughout the master's portion of the building shall be stained and waxed and throughout the servants' portion of the building it shall be veneered in a natural color. The floors throughout shall be filled and shellacked.

of same or a layout approved by them and shall guarantee to heat all portions of the building where registers are placed to 70 degrees in zero weather.

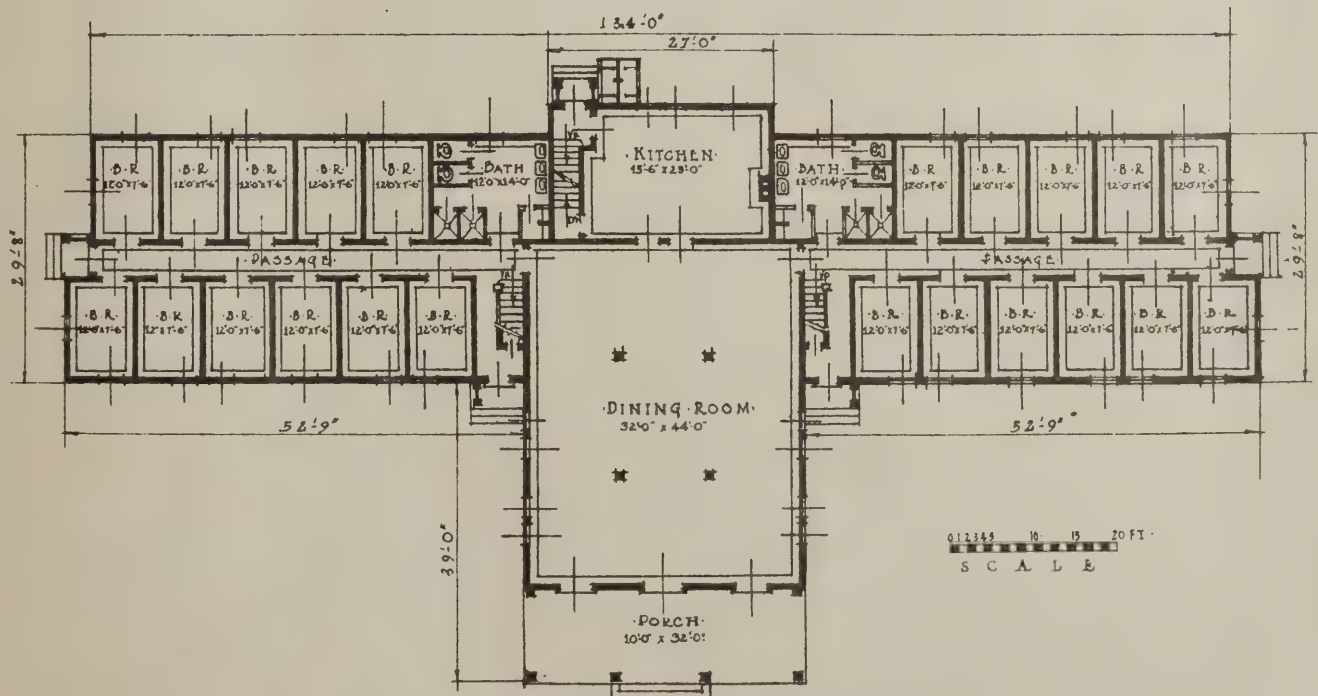
The type of boarding house which has been designed for Perryville is a two-story Colonial building having forty-four single rooms, two double rooms, lounging rooms, large front balconies and kitchen and dining rooms. A feature of this design is the provision of a small two-room and bath apartment directly accessible from the kitchen by a private

ing. The application of flexibility of design to a school building in a growing community is a feature which should not be overlooked.

The general layout of this village is one which is certain to result in satisfaction on the part of tenants, and is conducive to healthy civic life and growth. Owing to advantageous, geographical location and careful town planning features, this village is destined to be one of the attractive industrial developments of America.

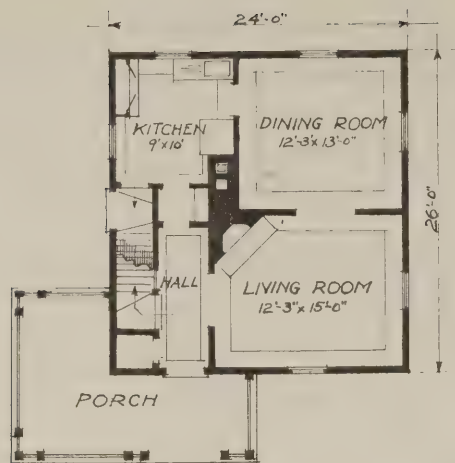


· SECOND FLOOR PLAN ·

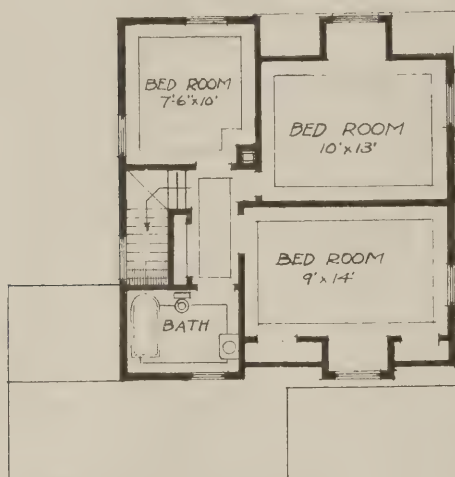


FIRST FLOOR PLAN ·

Boarding House for Forty-Eight Men



First Floor Plan



Second Floor Plan



A Typical Six-Room House at Perryville, Md., of Colonial Design. This House is Constructed Along Simple and Economical Lines



A Comfortable House with Six Rooms and Bath Having a Living Porch as a Special Feature

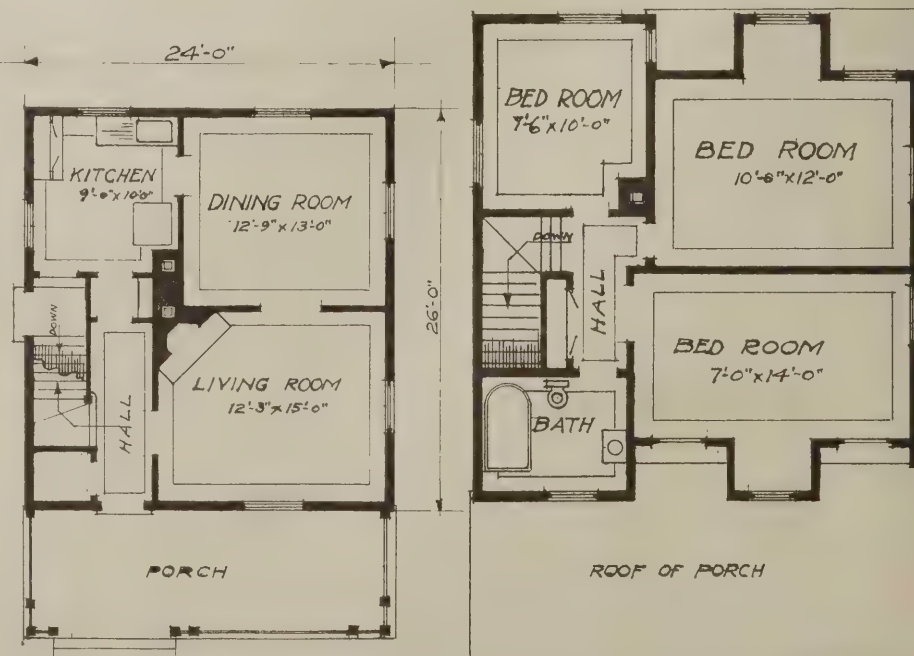
OTHER PLANS AND PROJECTS

In the article on "The Crisis in Investment Building" in this number, Stanley C. Taylor advises builders to save and file carefully for reference all descriptions of good building plans. Mr. Taylor is the Project Engineer of Mann & MacNeille. The advice he gives in the article referred to and the plans here presented come together. The method of laying out a floor space may be adapted to a variety of exteriors, and, as we have said before, the biggest architects in the country are giving their abilities to planning small homes whereas before the war their time was entirely taken up with the larger engineering interests.

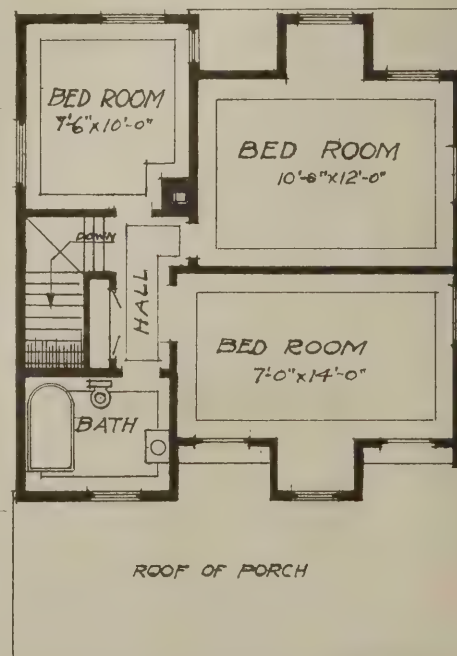
This is not to say that anything that these men offer is to be taken as right just because they designed it. But because they have proved by their works they have the gift of common sense in designing structures suited to the purpose for which they are to be used.

Big Work for Builders

We have heard a good deal about builders "skinning the job" but it is as often or more often the owner's fault that bad and cheap construction has



First Floor Plan



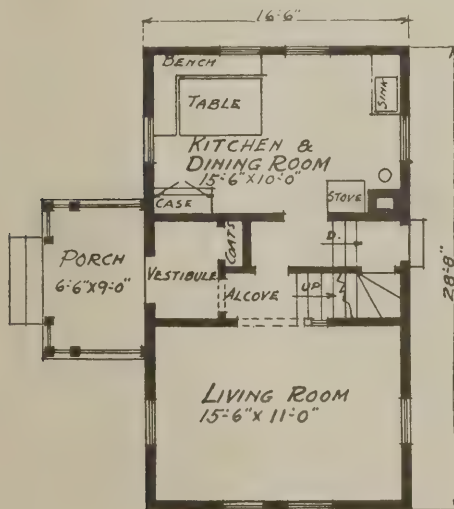
Second Floor Plan



A Four-Room House at Perryville. This is an Unusual Design but Simple of Construction and Providing the Special Features of a Combination Kitchen and Dining Room

been used—to the builder's disgust. Now the country is awakened to the fact that if we are to have a unified people good homes must be provided for them.

A man or woman born in this country is in great luck but it is no personal merit of theirs, but of their parents or



First Floor Plan

parents' parents. But a foreigner coming to this country and becoming a loyal citizen has used judgment and it is up to us all to make him realize that all his interests are here.

How is this to be done?

The biggest men in the country have come to the conclusion that the first thing to accomplish is to provide better homes.

They have formed the Inter-Racial

Council, with headquarters at Room 1006, 120 Broadway, New York.

Their programme is that correct housing for the industrial worker is a problem that interests the enlightened employer as much today as correct housing for his machinery, and it is high time that the needs of the laborers should be considered. A large part of the present industrial unrest is due to the neglect of this vital requisite in the past. The foreign worker, especially, is in need of intelligently planned homes, for, left to himself, he is apt to crowd into slums and shanty towns, where he often pays exorbitant rents for shelter unfit for human beings.

Naturally, this leaves these workers in an unfriendly mood toward America, and they fall an easy prey to preachers of violence and unrest. Housing that makes for contented labor is an asset in any industry, and should be so considered. This is one of the many points of contact between the foreign born worker and the employer that are being studied and acted upon by the group of prominent men and women who have formed the Inter-racial Council.

It is estimated that a million foreign born men will leave America as soon as the bars are let down.

Why do they want to leave this country?

It is claimed that the development of new republics in Europe has unsettled the belief that America is the "land of promise" and that millions of immigrants feel renewed interest in their former

homes, and indifference toward this country.

Is this true?

It has been stated that the savings of the foreign born go back to Europe in a steady stream and that little is done to check this drain upon our resources.

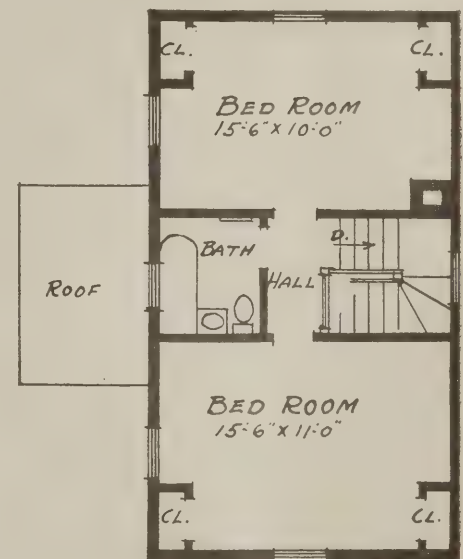
To what extent is this correct?

What effect will all this have upon American Industry?

And what are we going to do about it?

Questions such as these are of vital importance to the leaders of American commerce, industry and business. They are of interest to every American, but to the employer of labor, and the financial backers of industry they are of supreme importance.

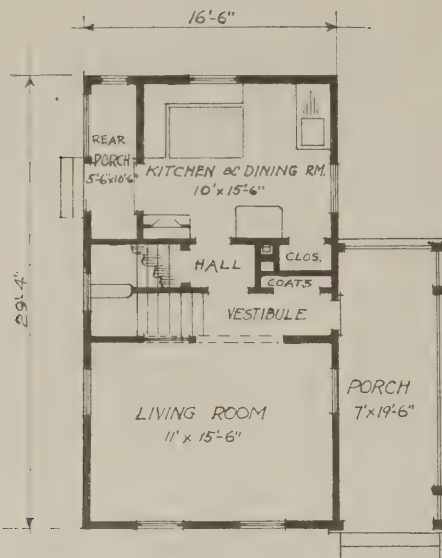
It was in order to study and act upon the facts about the foreign born in America that the Inter-Racial Council is formed. The assemblage is typical of America for includes men of distinction in finance, industry and commerce; men who lead organized labor and others eminent in science, education or statesmanship, while the foreign born living in the United States had spokesmen of their own race to voice their views and express



Second Floor Plan

their aspirations. In this period of the world's progress it goes without saying that women as well as men are given places of responsibility in the conference.

If this country is to pass through a sane reconstruction period, without violence, anarchy or civil strife, it will be necessary to get facts like the following into our consciousness, and then to act upon them with intelligence and justice. In America we have 33 million foreign born or of foreign parentage. We have 33 races, speaking as many languages. Many of them are hostile to each other and indifferent to America. When the war began, it was discovered that 3 million persons here did not speak our



First Floor Plan

language and 6 million were without American contacts, or quite out of touch with the land they live in. There are 1,146 foreign language papers, 300 racial organizations of national scope and such local organizations number 23,000. We have foreign colonies in our cities and industrial towns and a general policy of indifference or worse toward the average foreign laborer, leaving him to the mercy of slum landlords, labor exploiters and swindlers of all sorts. Such are the facts.

That there should have arisen from the foreign born a splendid response to patriotic appeal during the war, shows how promising is this material for the building of our nation which we have ignored in the past. But in the new period that we are entering, we must harmonize all these elements, if our nation is to hold together.

Whether we enter a League of Nations or not, our problems are henceforth inter-racial, and it is time for the business man to enlarge his horizon accordingly. The Inter-Racial Council is the beginning of this new movement.

More School Buildings

Its program is clear cut and practical: first, the immigrant is to have every inducement to acquire the English language and learn what America stands for; its ideals, its form of government, its customs, its history and literature. Only by such elementary education in Americanism, can the foreign born become one of us.

Second, the immigrant is to receive the same fair treatment by employers as is accorded the native born worker able to protect himself. No exploitation of immigrant labor, but friendly cooperation must be the future course, and the foreign born must have this policy made evident both by words and deeds. The suppression of racial customs or language is not contemplated, for the foreigner

brings us much that is desirable in the culture of the Old World.

Third, the promotion of harmonious relations between the various racial groups in America, so that the foreign groups here may establish friendly contacts with each other as well as with native Americans.

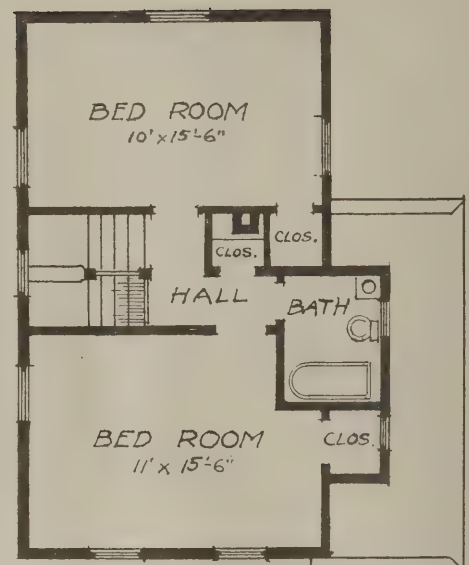
Standardizing Labor Cost and Conditions

What this means on a national scale can be understood by the application of this principle to industry. In a shop employing about 500 workers it is the policy of the proprietor to place his operatives in such a way that there shall be no cliques or sets based on race. Italians, Jews, Poles and Russians, are scattered among native Americans, Irish and French. Only English is spoken during working hours, and courteous English at that. The result is an unusually harmonious shop, with no hostile groups trying to stir up trouble with the others.

That should be the condition in the United States today, instead of the present discord of racial groups and foreign colonies, which are a fertile field for the growth of theories opposed to American democracy.

A National Program

It is proposed that the United States Government shall take a hand in this



Second Floor Plan

The motive of this bill is expressed in Secretary Lane's recent address in New York:

"Congress will be asked to help and all the states will be asked to cooperate to kill illiteracy in the United States, whether it is among the children or among the grown-ups, and I want you to help.

"We want to interpret America in



A Four-Room House at Perryville with Living Room and Combination Kitchen and Dining Room on First Floor

work, under direction of the able Secretary of the Interior, Franklin K. Lane. In a bill presented to Congress this session, the education of native illiterates, of persons unable to understand the English language and of other resident persons of foreign birth is proposed, and an annual appropriation of twelve and a half million dollars is asked for, to carry on this important work.

terms of fairness, of fair play, of the square deal. We want to interpret America in healthier babies that have enough milk to drink. We want to interpret America in boys and girls that can read and in men and women that can read, in better housing conditions and wages, and hours that will give an opportunity to a man to know his family and live and support them like a man without apology."

Tool and Machine Records

By Daniel J. Hauer, C. E.

START right! It would seem useless for a small contractor to keep a record of the few large machines he possesses, but if his business grows a tool and machine record system will be increasingly valuable.

Use a Name Plate on Machines

Put your name and a number, as well as a date, on your large machines, either with a plate, or painted on. This will

MIXER NO. 200

Wm. Jones Co.
Builders
Moline, Illinois

PURCHASED 2-10-18

identify it among other machines, and advertise you as well. Numbers in series are best: each series identifying the character of the machine or tool. For instance: 1 to 99 for saws; 100 to 199 for engines; 200 to 250 for mixers, and so on. Each piece or unit of a machine should be given a number, as they may be transferred from one machine to another, or several may be used to make up a single apparatus. Machines are money—keep track of them.

Be Known by Your Paint

Use one or two colors of paint on all

your machines, so that the colors will mean You. Establish an identifying standard of colors and make them yours.

Card Records

The card index system for keeping a record of tools and machines, being elastic, is the best all-around for small or large contractors. The card sizes used will depend on the character of the record required by the business. Two records are kept in some cases, one for tool house or machines in localities where work is under way, and the main office record against which these are checked.

Reference Record

In Figs. 2 and 3 a sample of a record card is given. The description on the card tells it is a power saw with combination blades and a gasoline engine. Under the manufacturer's name is shown that the saw was made by the E. D. Blank Company, while the engine came from the Blank Engine Company. The manufacturer's number on the saw is 1251, while that for the engine is 2026. The owner's numbers are 10 and 116. For this machine neither the size nor capacity is listed, as would be done for a concrete mixer. The date of purchase is shown as June, 1917. The reference is given to the 1916 No. 10 catalog of the E. D. Blank Company, and 1915 catalog of the Blank Engine Company.

The spare part list for the engine is attached by a clip to the card, while that for the saw is in the catalog. Under H. P. is shown the horsepower of the engine. Under remarks is told that there is a band saw; also 6 to 12 inch diameter rip and cross-cut saw. At the bottom of the card is shown the list of tools that came with the machine. To the right is a record to show the cost of the machine and the repairs and renewals.

On the back of the card is shown what jobs the saw has been used upon and where it is located at present. (Fig. 3.) For instance, when it was purchased on

Jobs	Yard
5-10-17	Clark's Cottage
8-30-17	Lipp's Mill
	2-4-18
4-16-18	U.S. Govt. Rented

June 10, 1917, it was used on Clark's cottage; finishing with it there on Aug. 30, 1917, it was sent to Lipp's mill, where it was used until Feb. 4, 1918, when it was placed in the storage yard. On April 16, 1918, it was rented to the United States Government.

Suited to Any Needs

By this simple method a record is kept of what money is expended on a machine, the work it does, and where it is located, giving complete information regarding the machine at all times. Repair parts can be ordered easily and correctly, often saving much time and money on the jobs.

		REPAIRS	
NAME	DATE		COST
DESCRIPTION	5-10-17	Purchased	6.00
MNFRS. NAME	8-1-17	New Set Saws	75
MNFRS.	3-5-18	Spark Plug	1.80
MNFRS. NUMBER			
OUR NUMBER			
SIZE			
CAPACITY			
DATE OF PURCHASE			
REFERENCE			
LIST FOR REPAIRS			
H.P.			
REMARKS			
TOOLS ON MACHINE			
DRIVER			

Economy is not represented by the amount spent but by the wisdom of the expenditure.

—Secretary Redfield

Investment Building

By W. R. Safford

Without entering into the merits or demerits of investment building on the score of timeliness, there are warnings that are always timely. It is with these this article has to deal

BOTH architects and builders are not always mindful that an apartment building is usually a strictly commercial proposition. That is, apartment buildings are built primarily to earn a profit for the owner and not merely to produce architectural monuments to the skill and taste of the architect.

If a butcher buying a side of beef at a certain price should retail the different cuts to his customers at less than what the beef cost him in the first place he would prove a failure. No matter how exemplary he might be as a humanitarian, as a business man he would be a fool. Butchers don't do business that way.

Yet, there are owners of flat buildings who put their good money into a proposition with the expectation of receiving a reasonable income from the investment, but who eventually find they have put in more than they can take out; and there are many architects and builders who aid and abet them in their money-losing schemes.

Figure the Investment

Partly the fault of the architect who designs too expensively and partly the fault of the builder who constructs without economy, it is also much the fault of the owner, because he doesn't conservatively figure out his investment before making the plunge.

You may hire experts to do your planning, but you will find no man quite so able to safeguard your money as yourself, Mr. Owner. It is up to you to check up your experts and see that your investment in an apartment building shows a proper percentage of profit before you go ahead.

You, Mr. Architect, and you also, Mr. Builder, can greatly assist the owner in making his legitimate profit if you will advise him faithfully along profitable lines and remember, above all things, that he is not a philanthropist. He is probably looking for a safe and profitable return on his money. If you do not understand his point of view and are not sufficiently skillful to solve his problem along these lines, then you ought not to be posing as an expert in apartment house work.

Flats in a Small Town

Of course, the problem of flats to rent for profit in a small town is quite different from what it is in a large city. Your tenants in a small town are of a very different class from those in a city; their requirements are not at all similar and the price they will pay for what they want fluctuates from the height of extravagance in the fashionable section of a large city to the tightest of economy in a modest little town.

Description of Tenants

With a certain lot in mind on which it is planned to erect a building for commercial purposes to yield the utmost of profit for the owner, an expert should first get the lay of the land to determine

The Skinner Skinned

The builder who has "skinned" a job makes a poor profit in that he has skinned his own hide.

what sort of tenants it will pay to go after. That is, he should understand from knowledge of the section of town in which the property is located, what class of people will be most attracted by his proposition. If they are humble working people, probably unable to pay more than twenty or twenty-five dollars a month, he must figure the kind of building that can be built to yield the maximum of profit at that rent. If after people who can spend money liberally, he must spread himself accordingly, and provide them with something more luxurious—a plan to make higher rents possible.

It is only after careful study of the problem in this way that the expert, be

he builder or architect, can intelligently advise the owner. Whatever proposition is put up to the investor should be carefully figured out as to first-cost, cost of maintenance and net yield in profits, so that the owner may be assured of a profitable investment.

MAKE BUILDING SAFE FOR INVESTORS

What is it that is holding building in suspense now? Lack of confidence—in the main.

It is true that the times are extraordinary, but in ordinary times have builders made their calling one in which the public was assured of a reasonably square deal?

We won't say—but simply point to the solicitude with which the associations are urging the individual members to see to it that in themselves the "dignity" of the builder and his "standing" in the social and business world shall be exalted, and the craftsmanship and art of the Business of Building be lifted away from the obloquy and contamination that attaches to lien laws and surety bonds.

And this is not to say that the builder is not in general as square a man as any other business man or craftsman or artist. He needs to be more honest—because he is more in the limelight. His works speak too loudly for or against him.

Again, one who falls by the wayside, through bad business methods pressing on his own moral weakness, gives a taint to the entire industry that is hard to dispel. Mr. and Mrs. Grundy are more industrious in finding fault than in boosting, and they don't let any choice morsel of scandal lose in the telling.

MAKE BUILDING EASY TO BUY

Most men shrink from building a home more on account of uncertainty and anticipated worries about getting what they want and what they pay for.

If they knew they bought the builder's faith as well as his skill and knowledge their hesitation would vanish.



National Builder

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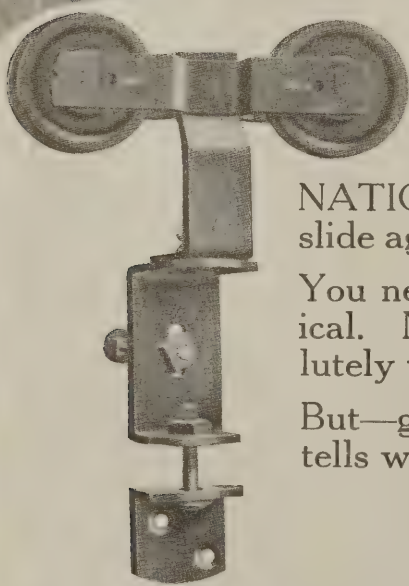
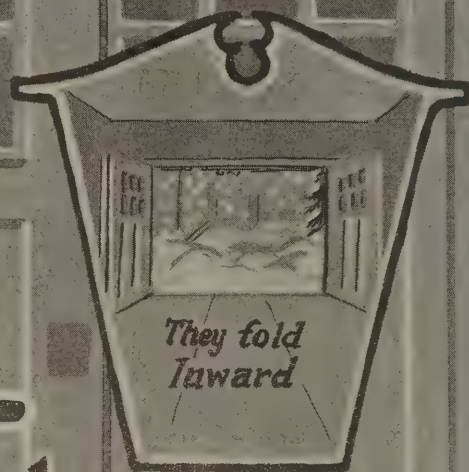
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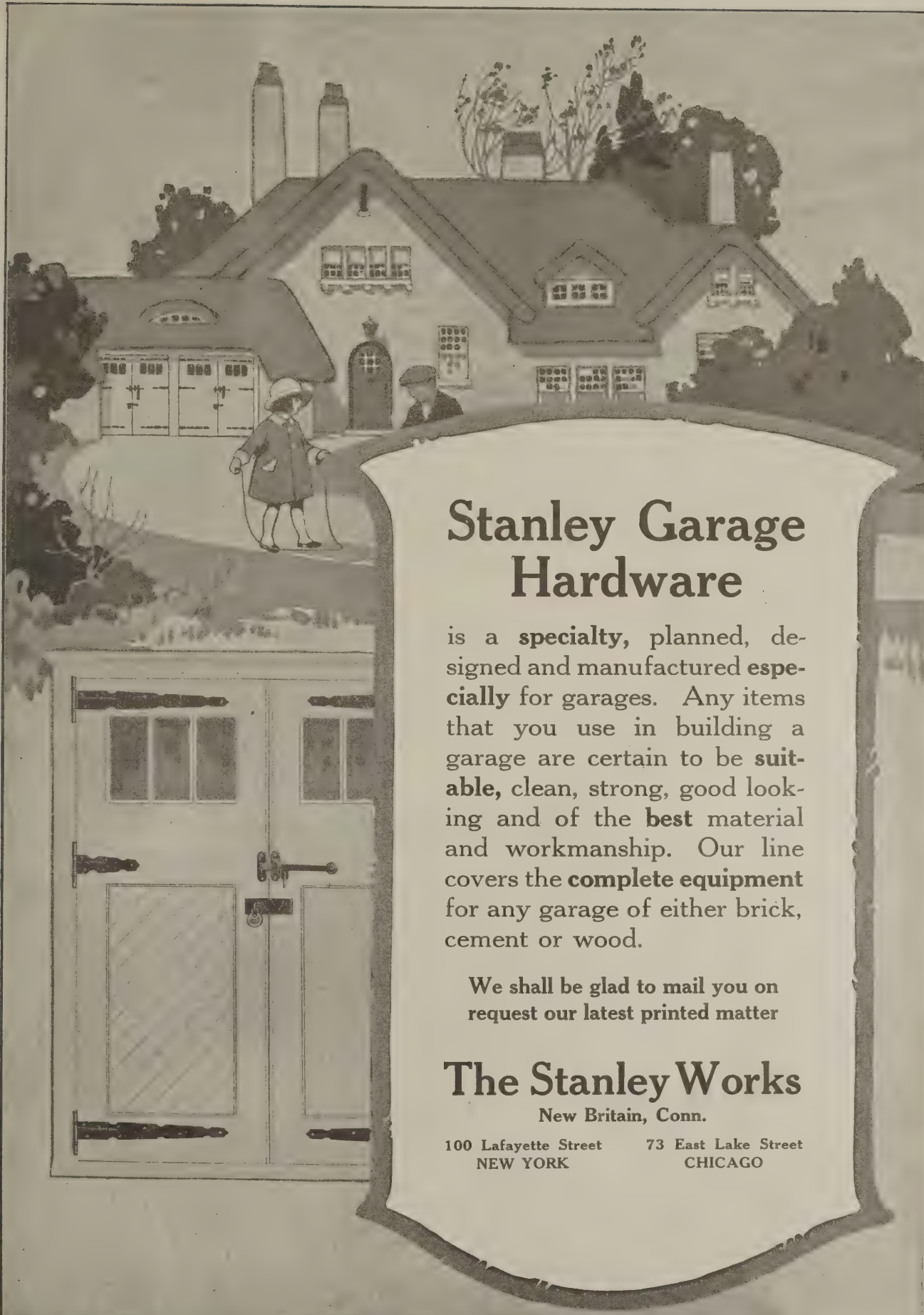
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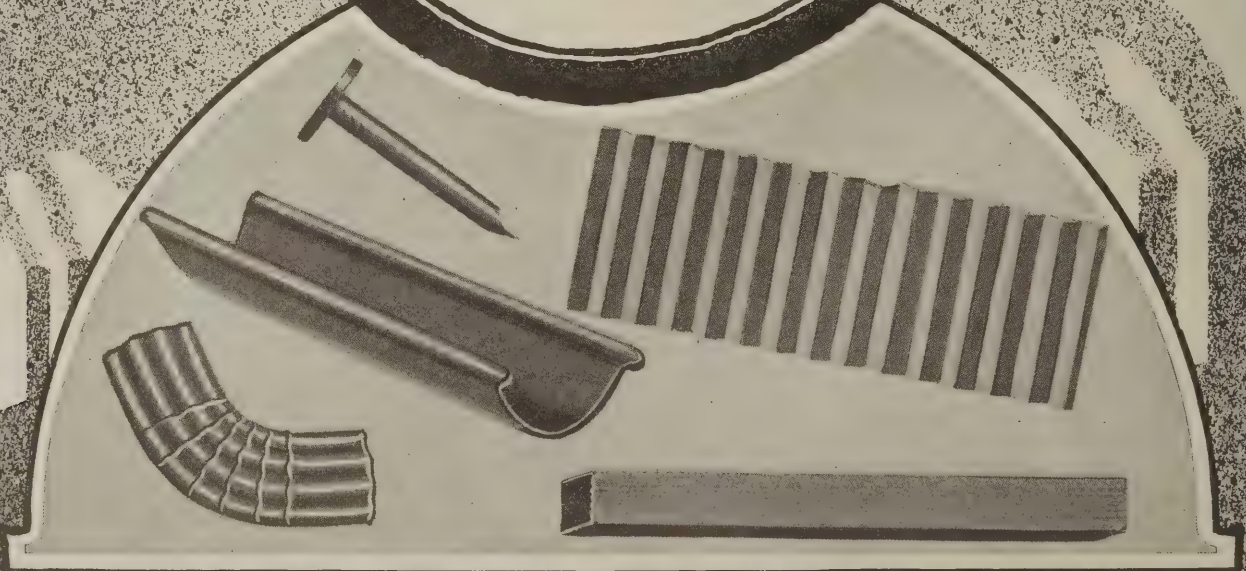
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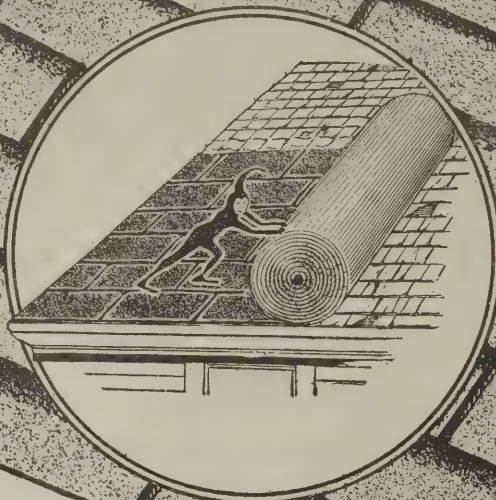
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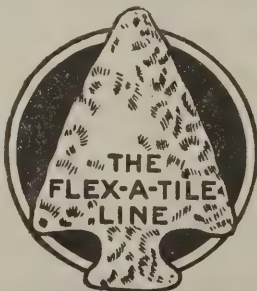
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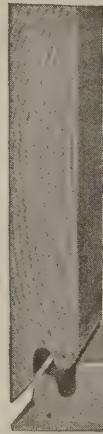
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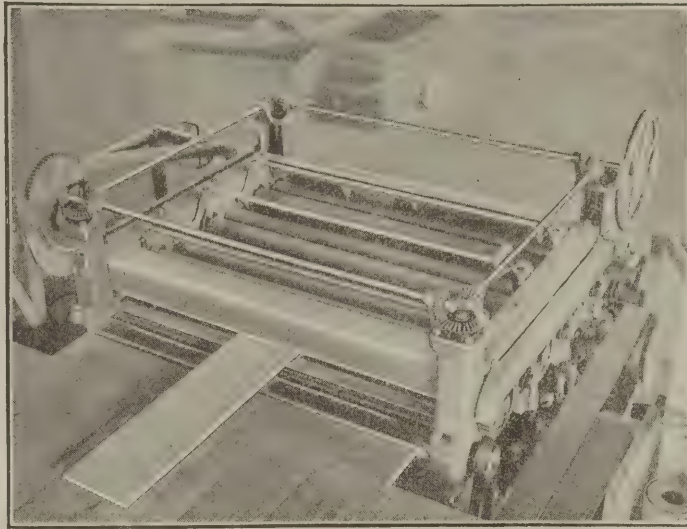
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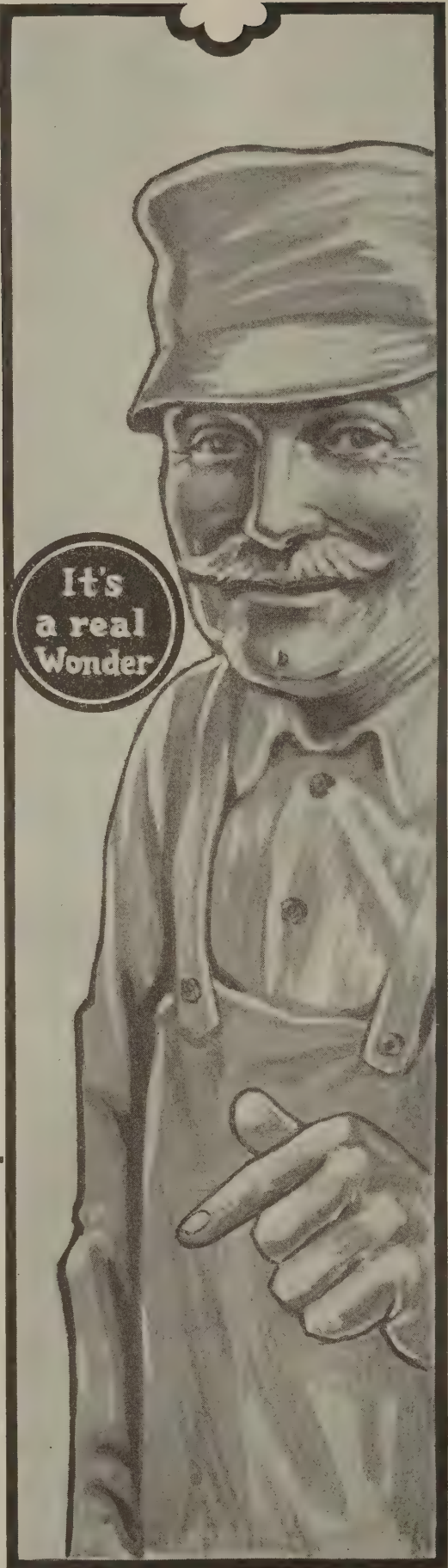
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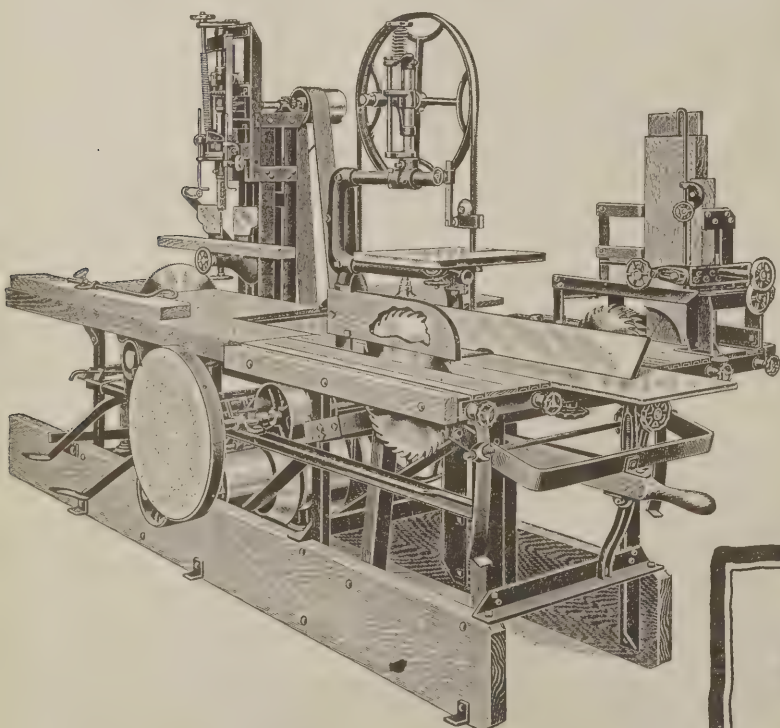
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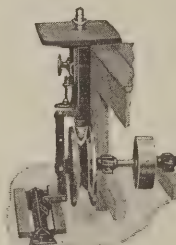
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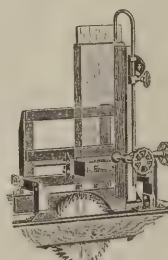
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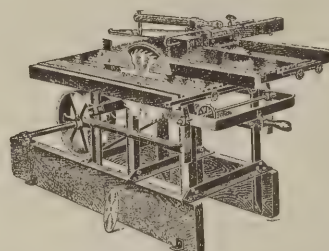
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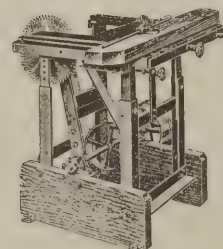
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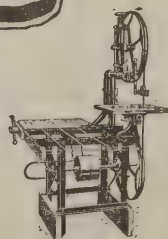
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Rip Saw



Swing Saw



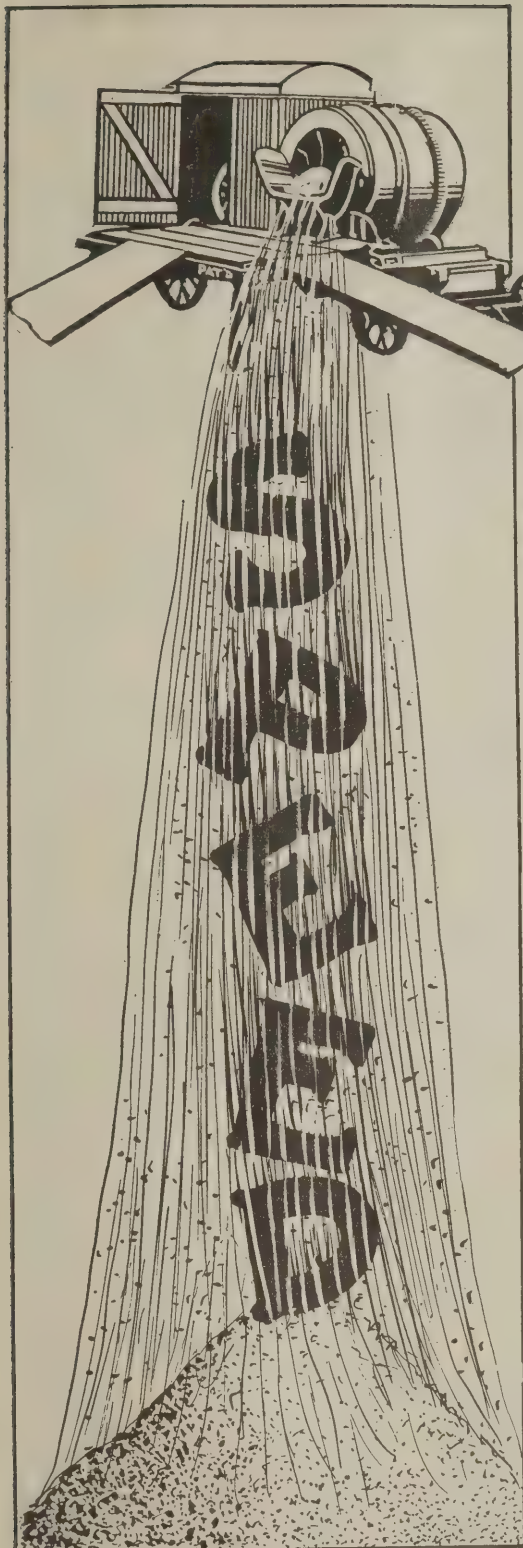
22" Band Saw



12" Jointer

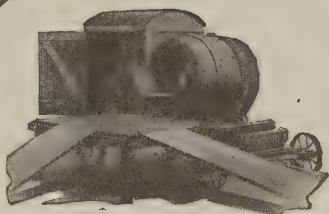
The Parks Ball Bearing
Machine Company

1540-1546 Knowlton St., Cincinnati, O.



"The Standard"

LOW-CHARGING MIXER



If we could prove to you that "The Standard" Mixer saves one-third the cost of mixing, you'd be interested. Of course! And we can prove it. Thousands of contractors are effecting this saving.

The saving is due to the low charging principle, simplicity of construction and the absence of mechanical loading devices which get out of order constantly.

Start out today to end the high cost of mixing. The first thing to do is to write.

"The Standard" Contractors' Equipment

We manufacture an excellent Portable Variety Woodworker. Twelve tools in one.

And we can satisfy you if you're in the market for Hoists. Single Drum, Double Drum, Reversible, Non-Reversible. Our Hoist Catalogue shows and explains the various models.

"The Standard" Pump Catalogue will also interest you. Centrifugal, Diaphragm, Trench, Deep Well Outfits, etc.

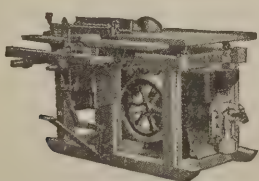
Tell Us in What You're Interested
and Ask for Catalogue No. 32

"THE STANDARD" CONTRACTORS' EQUIPMENT

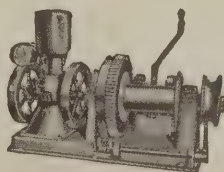
THE STANDARD SCALE
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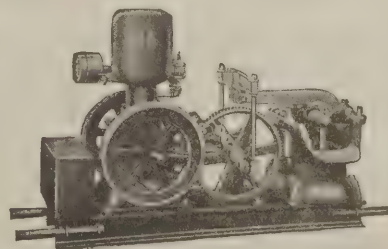
& SUPPLY COMPANY
BALTIMORE CHICAGO CLEVELAND
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Saw Table Y-161-157



Hoist Y-161-52

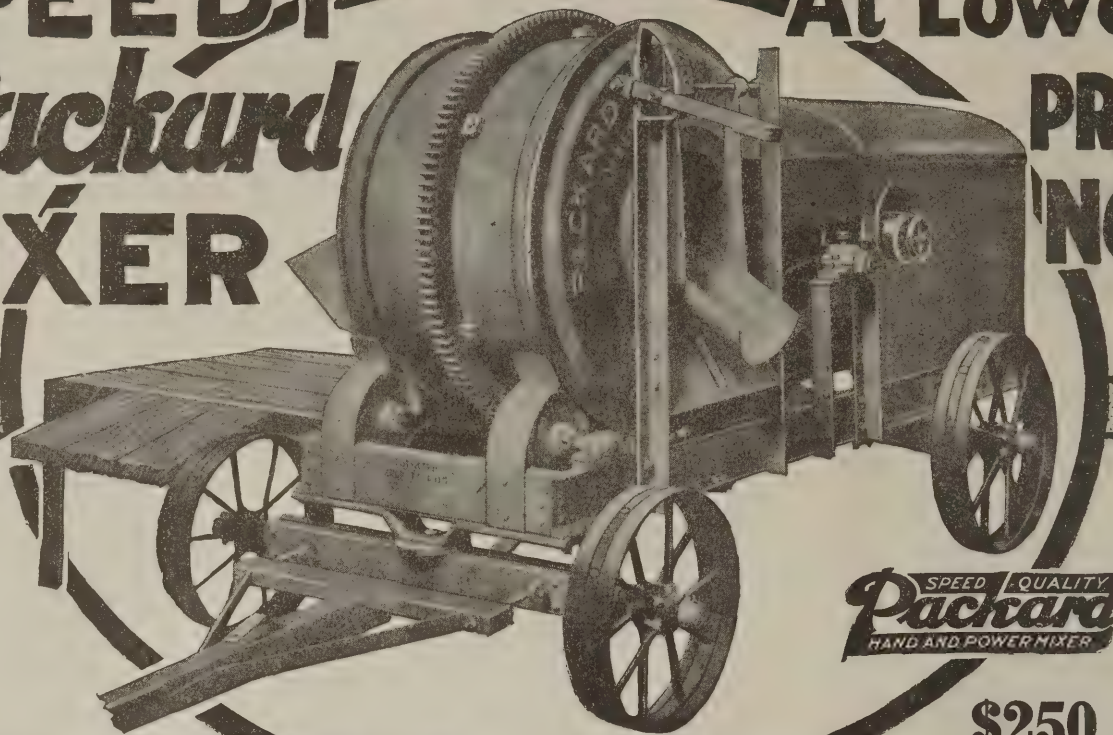


Pump Y-161-97a

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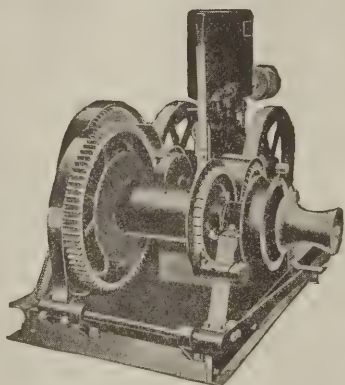
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Building Time. Get This 1919 Equipment

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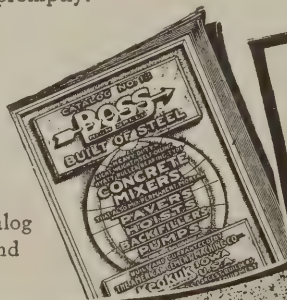


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Heavy Duty Contractor's Hoists. Single and Double Drum Reversible, all built like a steam rig. Hyatt Roller Bearings as in all Boss equipment. Sheave and Niggerhead. Safety ratchet. Steel frame. 6-8-10 h. p. sizes. Cost no more than ordinary hoists.

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Our "Boss" and "Packard" lines afford you an opportunity to secure the fastest, sturdiest, simplest Contractor's equipment on the market at lowest prices. Get our Catalog now.

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“That Silver has saved me lots of Silver!”

Our Catalog No. 63 embraces all the many Silver Machines manufactured. Each one is a top-notch or we would not produce it.

You, as a builder and contractor, are undoubtedly on the lookout for good wood-working machinery, such as

Band Saws, Swing Saws, Jointers, Saw Tables, etc.

Hence it will pay you to investigate Silver Machines. Start the ball rolling—today—by telling us your needs. Or simply

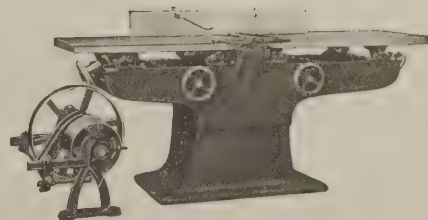
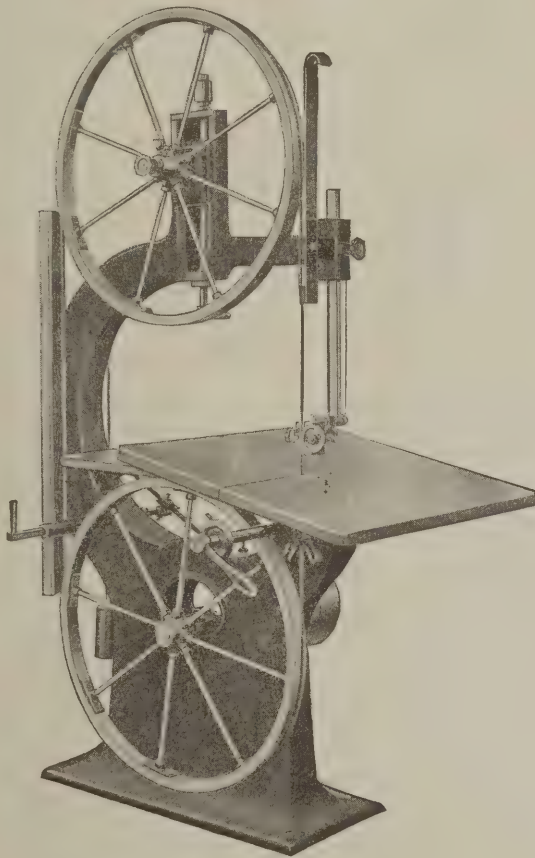
Ask for Catalog No. 63

The Silver Mfg. Co.
Salem, Ohio

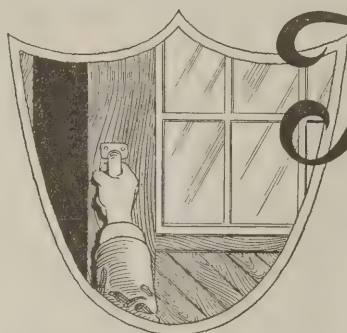
Silver's Improved Band Saw

is equipped with an improved Non-Friction Roller Saw Guide. The saws are 20, 26, 32 and 36 inches.

Easy machine for operator to handle. He can shift belt, adjust upper wheel, tighten saw, lower or raise guide and tilt table, without changing his position at saw.



The Never-Ending Test of Your Professional Judgment



THE garage door is opened several times a day, and every time your patron opens his garage or barn door your reputation is at stake.

Let the door stick and he'll swear a blue streak. But with proper hangers the doors will open with pleasing, silky-smoothness. And your patron will have only words of praise for your work.

Progressive contractors realize the importance of using good door hangers—not only as a protection to reputation as first class builders, but also from a standpoint of satisfaction that builds for future business. And they naturally choose the easy running

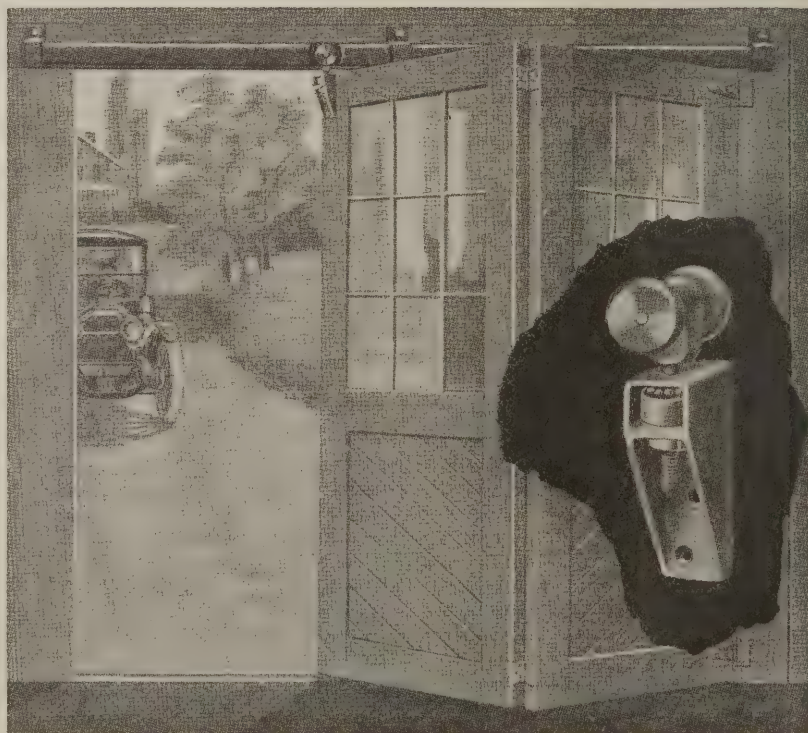
Coburn Door Hangers

They are noted for their top-notch service and ease of operation — never sticking and always swinging at the slightest touch.

Simply, yet durably constructed. Save money on each job because they are easy to install.

Send us a diagram or tell us the conditions for the sliding doors on any garage, house or barn upon which you are figuring and we shall be glad to send you, gratis, detailed drawings and specifications.

Our reputation hangs on Coburn Hangers. They must give satisfaction.



Coburn Trolley Track Mfg. Co.
Holyoke, Mass.

Northwestern Drum-Mixers

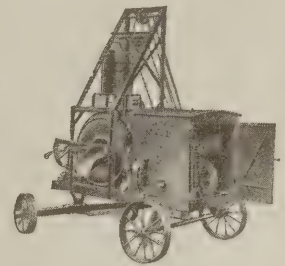


For Road Building and All Forms of Concrete Construction

Northwestern Drum-Mixers combine the simplest, strongest form of construction and are the veteran products of efficiency. Every essential feature perfected. Sturdy, speedy, durable, dependable. Price and performance will please the buyer.

Engine is frost-proof and reliable. Will operate with kerosene or gasoline.

Special end-discharge mixer for bridge, slab and alley work. Write for Bulletin 10 describing it.



Northwestern Steel & Iron Works, Eau Claire, Wisconsin

Bid on the Whole Job

Make EXTRA MONEY on CONCRETE Work

Why be satisfied with part of the job? There's a lot of extra profit in Foundations, Walks, Floors, Walls, etc., to be made by any carpenter-builder equipped with a SHELDON BATCH MIXER. It's compact, easy to move, sturdy and efficient—will work one man or six. Does all ordinary jobs cheaply and makes a profit where no other will. Mixes mortar and plaster, too, if you wish. Here's the biggest little helper to extra profits you ever saw, and at a price that any carpenter can afford to pay.

Sheldon Concrete Mixers \$25⁵⁰_{UP}

DO BIG WORK FOR A LITTLE PRICE

Sheldon Mixers are rapidly taking the place of big, costly-to-buy, expensive-to-run, large capacity mixers—because they do the work of a \$200 or \$300 mixer and cost much less to buy and use. Many contractors who own large-capacity mixers have bought several Sheldon mixers to use for all ordinary work, from putting in foundations to building a bank, and all say the Sheldon is a work-eating, money-saving mixer. Read what Sheldon owners say in our catalog.

Get still BIGGER PROFITS on YOUR CONTRACTS

This year will see the biggest building activity this country has ever known. Get into the concrete game at once if you're not in it now. Get still bigger profits if you are already in it. You can "clean up" with the help of a Sheldon Mixer.

There is a Sheldon Mixer to fit every man's requirements—from the hand mixer on strong wooden frame to the No. 8 X power mixer on steel wheel trucks with 2 H. P. engine and Webster Oscillating Magneto, the lowest priced fully equipped mixer to be had today. The most popular Sheldon Mixer No. 4 (shown herewith) is a work-eating money-making mixer—built to stand the rough and tumble treatment that a concrete mixer always gets. The mixing drum is removable and the whole machine fits nicely in a regular wagon box—no expense, no lost time, or trouble in moving it from one job to another. You can get a hand

SHELDON MANUFACTURING CO. BOX 58 Nehawka, Neb.

SHELDON POWER MIXER No. 8 X, mounted on trucks. Equipped with 2 h. p. engine Price \$130.25 with Magneto



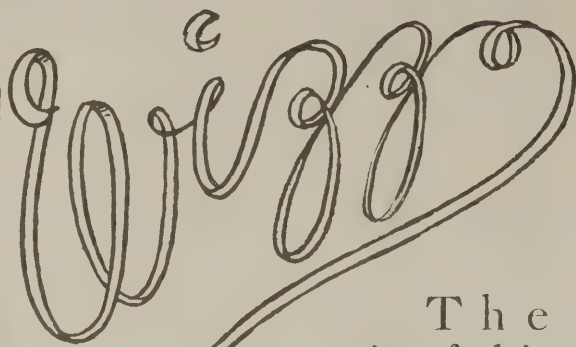
SHELDON POWER MIXER No. 4—the most popular style Price \$47.80



Sheldon Mixer for as low as \$11.50, by buying the iron and steel parts and building the mixer yourself from FREE BLUE PRINT PLANS AND FULL INSTRUCTIONS furnished with these Sheldon parts. All Sheldon Mixers have 3 cubic feet capacity or two wheelbarrows to the batch. The steel paddles inside the mixer drum are so placed that the concrete is THOROUGHLY MIXED, no matter what proportions you are using. No other mixer excels its quality of work—no other mixer approaches its wonderfully low price.

SEND TODAY FOR OUR FREE CATALOG fully illustrated in colors, showing every possible combination and quoting all prices—there's a price to fit every purse, and a free trial offer that puts it right up to you. Write today and you'll have time to get your mixer for the busy spring work.

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The music of this easily operated plane is pleasing to the ears of the man who uses it and the "feel" as it takes hold of the wood shows him that he has a good tool.

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REG. U. S. PAT. OFF.

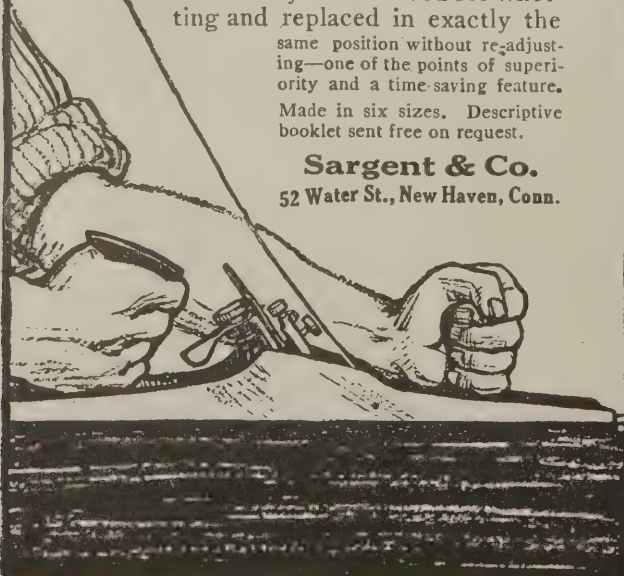
Auto Set Bench Planes

are intended for both heavy and very fine cuts. They are especially adapted for working against the grain on cross-grained hardwood without any tendency to chatter, the cutter having a solid support below and being firmly clamped above.

When the clamp is regulated for the required cut and is set, the cutter may be removed for whetting and replaced in exactly the same position without re-adjusting—one of the points of superiority and a time-saving feature. Made in six sizes. Descriptive booklet sent free on request.

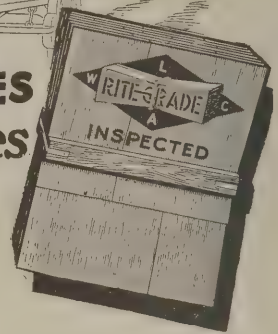
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And by honest is meant a shingle that is up-to-grade all the time, a shingle that is inspected by association inspectors, guaranteeing a maintained standard.



"Rite-Grade Inspected" Shingles and rust-proof nails make the forty-year roof.

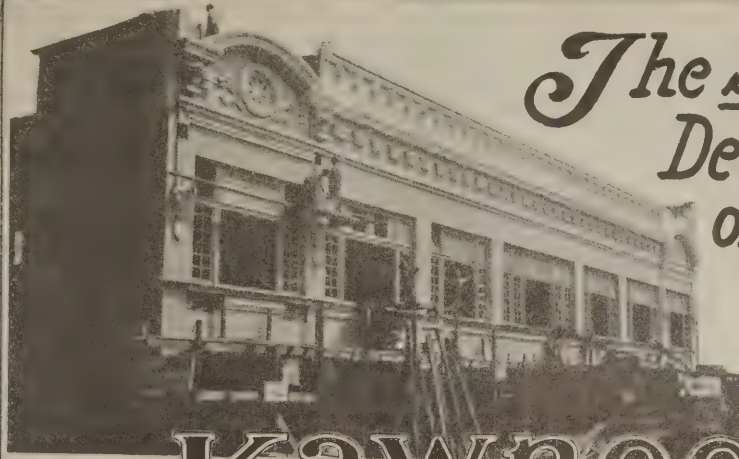
You can be certain that when you see the "Rite-Grade Inspected" mark on any bundle of shingles that, irrespective of brand, manufacturer or grade, you have a well manufactured shingle that is up-to-grade.

The use of hot dipped zinc coated nails is imperative to obtain the potential long serviceability of the red cedar shingle.

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Determine the Effect
of this Modern Building*

Kawneer

Store Front Construction

will show up this building—or any other—at its best. Since Kawneer Fronts were invented, some twelve years ago, over 75,000 have been installed. This proves their worth from an architectural and sales-pulling standpoint.

You can easily realize that the profitable installation of Kawneer Store Fronts is not confined to new buildings. The more antiquated the structure, the more receptive the owner is to the idea of modernizing it by the Kawneer method.

We help you in every way possible to make the job satisfactory. Service has been a big reason for Kawneer progress. Besides putting out the best material, we make every effort to design the proper front for the building in question.

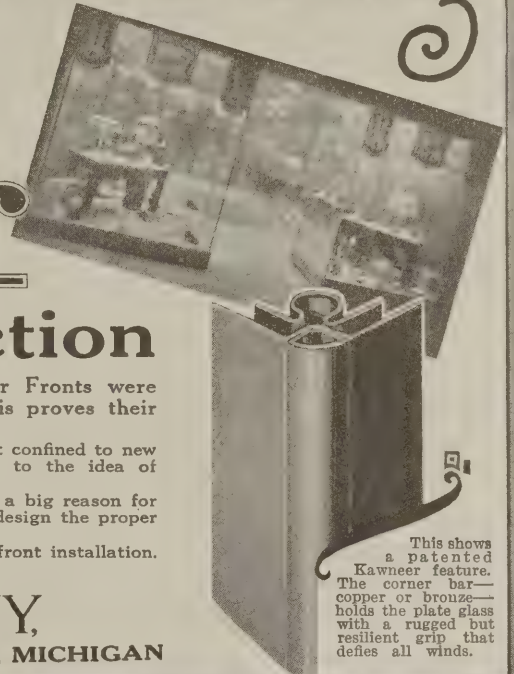
Our designers—experts—are ready to cooperate with you in every problem of store-front installation.

Write for Beautiful Catalogue

KAWNEER MFG. COMPANY,

1127 Front Street

NILES, MICHIGAN



This shows
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The corner bar—
copper or bronze—
holds the plate glass
with a rugged but
resilient grip that
defies all winds.

\$50 to \$100 Extra a Week Selling Protection

Rutherford G. Young, New Galilee, Pa., writes: "The Lightning Conductor business is booming. It is the easiest and most honest money I can make. I have handled Shinn-Flat for 8 years and am convinced you have the best system of Lightning Protection on the globe. It is no trick to make \$50 to \$100 extra a week."

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Shinn-Flat is the greatest scientific Lightning Conductor ever devised. It is endorsed by scientific authorities in preference to all round or other old-style cables or rods.

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Chicago, Illinois

Lightning Can't Strike IF Shinn Gets There First



"Has All the Others Beat to a Standstill!"

declares Architect John P. Butz of Wilkinsburg, Pa., referring to

Slidetite

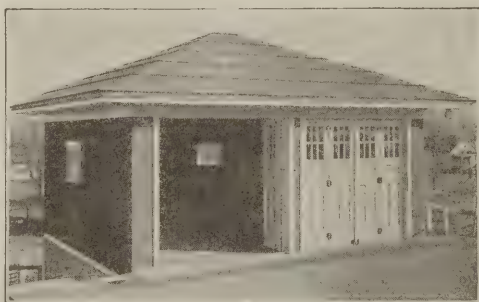
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Sliding Garage Door Hardware

"I have used all the different kinds of hardware to equip garage doors and I consider 'Slidetite' the best on the market today."

WEATHER-TIGHT

Doors hung on "Slidetite" Hardware slide and fold tight into the door frame like a house door, saving heat and keeping out the weather. Operate easily. Can't sag. Stand immovable without locks or holders. Make a fine looking garage.



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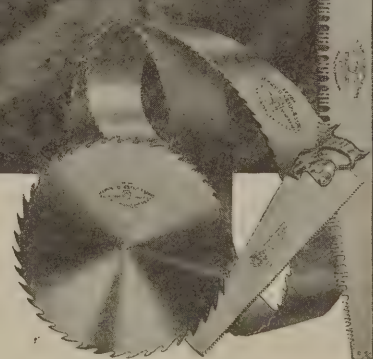
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1 Ton Capacity. Other Sizes 2 to 10 Tons

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This automobile cost..... \$325
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COMPLETE cost, \$575

The outfit shown has a carrying capacity of 2,000 pounds. Speed, 20 miles an hour. Operating cost, about 6c per mile. Runs about 50 miles a day.

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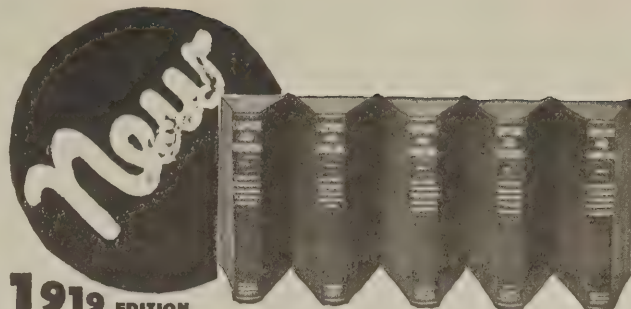
"I find these trailers to be the most profitable investment I ever made. The first one earned \$140 the second week we had it, and the average earning is \$75 per week. I feel that each trailer pays for itself every month."

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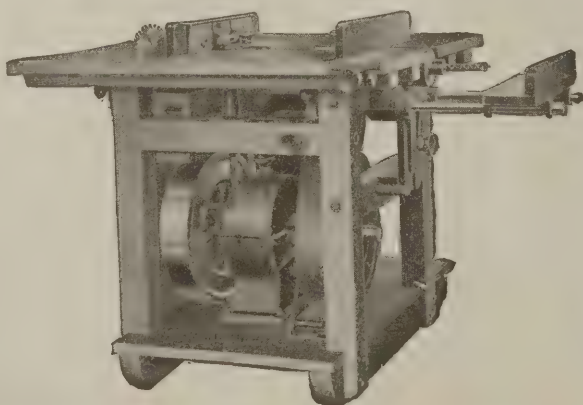
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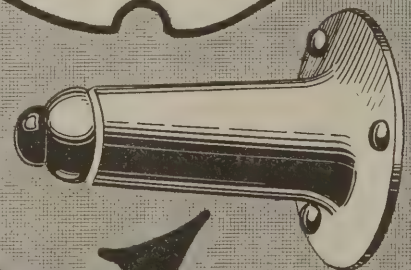
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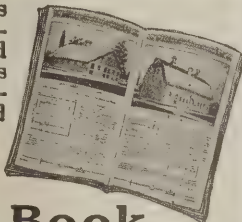


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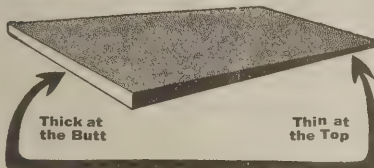


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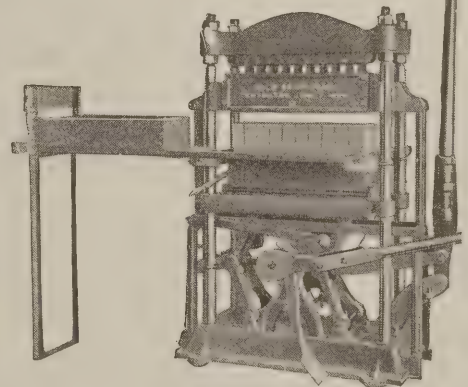
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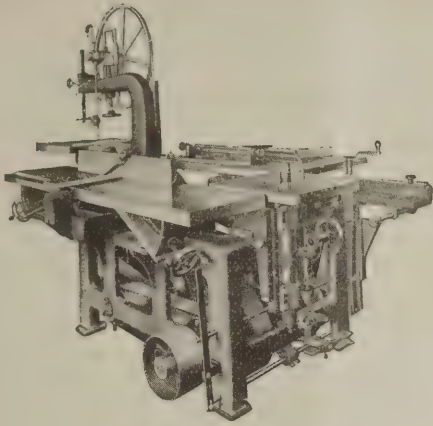
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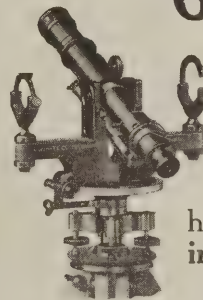
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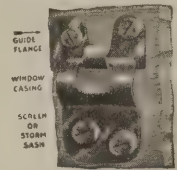
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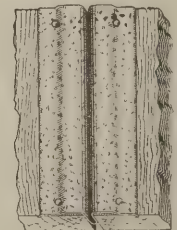


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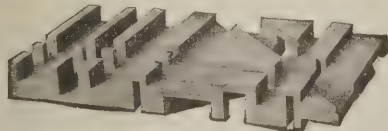


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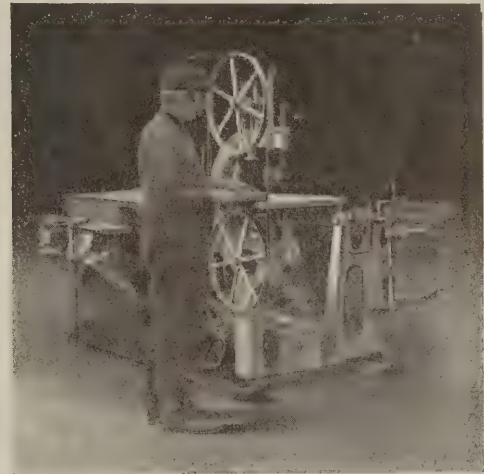
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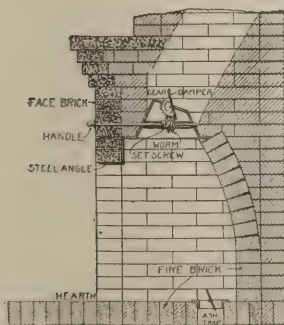


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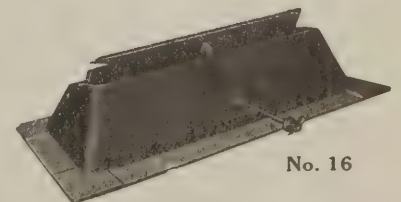
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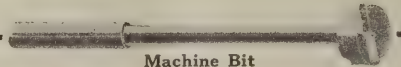
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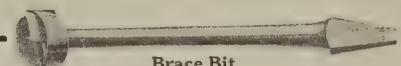
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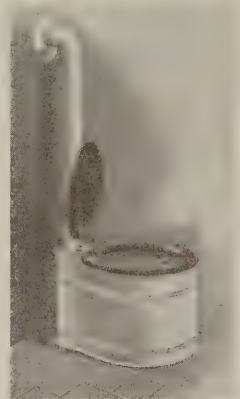
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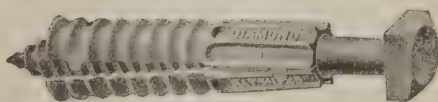
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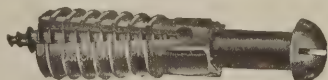


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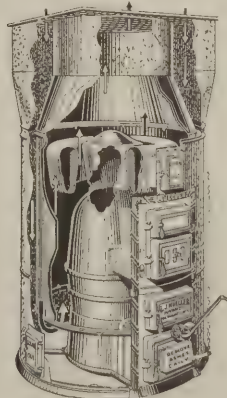
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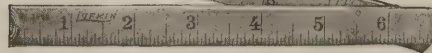
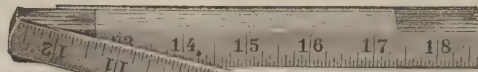
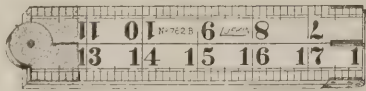
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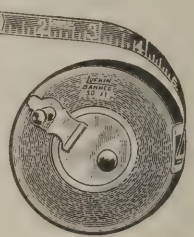
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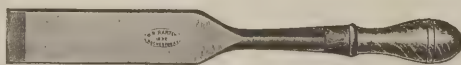
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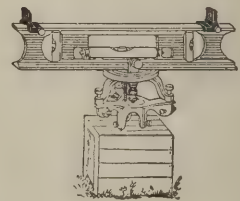
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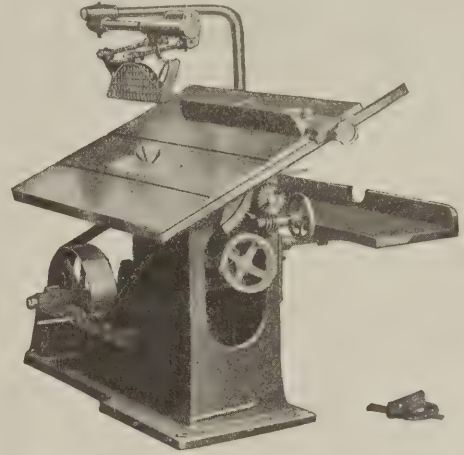
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Wood Working Machinery

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For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood-Carpet, strips, Plain and Ornamental Parquetry, Tongue and Groove Flooring.

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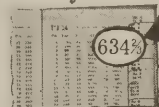
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**For Immediate Shipment
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3/8" Oak Flooring offers a very beautiful and economical floor at a very low cost for all classes of buildings. It is the ideal flooring for covering old pine floors in old houses as well as in new houses over cheap sub-floors.

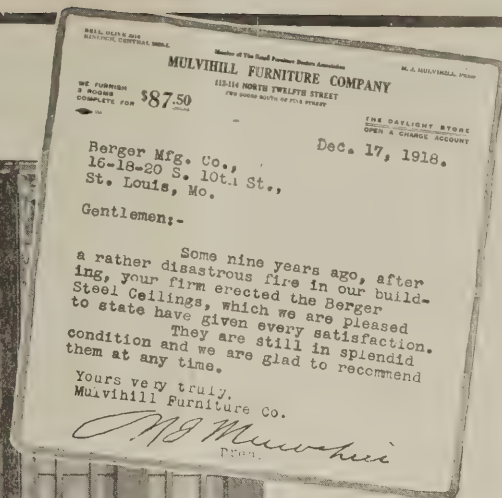
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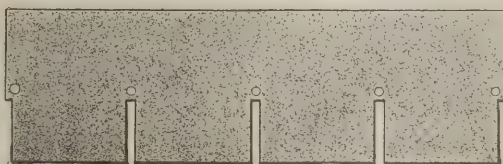
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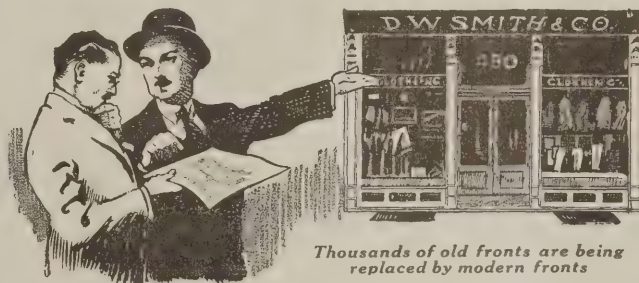


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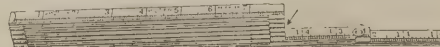
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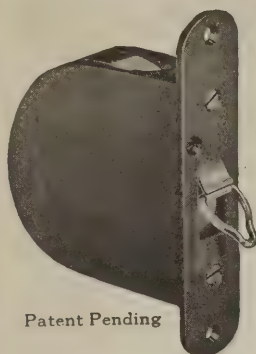


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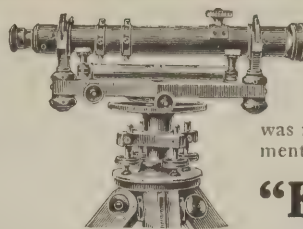
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For use in all classes of new work Box frames unnecessary. Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

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was made to meet your especial requirement, it should be worth investigating.

"KOLESCH" Builders' Level

Light in weight, built for hard usage and reasonable in price

The purchase of a "Kolesch" Transit or Level isn't an expense—it's an investment that pays big.

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The Great Diehl Line of Hardware Specialties

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Self Supporting Base-
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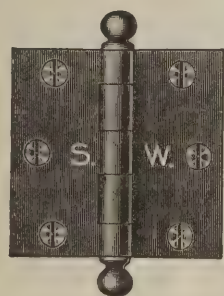
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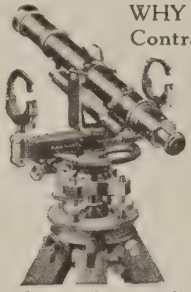
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WHY progressive and successful Builders and Contractors after a comparative test invariably select the

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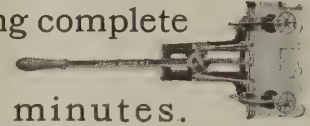
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The tool that serves
Miller Two-Minute Lock Mortiser**

Cuts an opening complete
for a mortise
lock in two minutes.



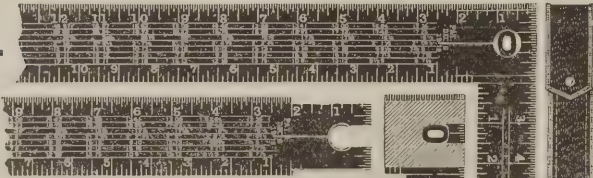
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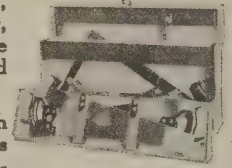
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Expansion joint takes up wear. Guaranteed to remain true. Write for prices.

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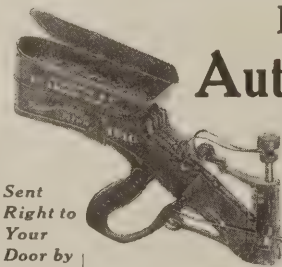
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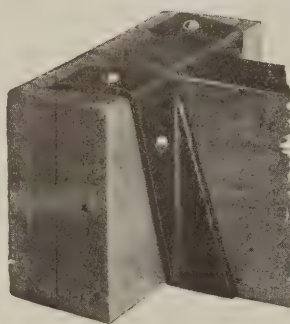
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Excels for Walls, Ceilings and Partitions
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Successful Roofing Contractors Buy Good Slate

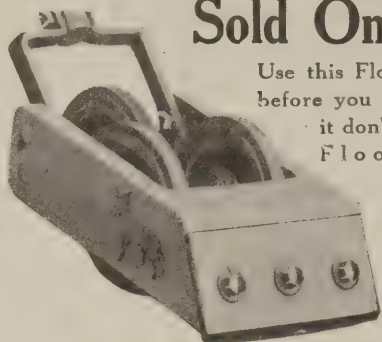
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There is big money in the "Universal Way" of Floor Surfacing. An electric motor does the work six times faster than by hand scraping.

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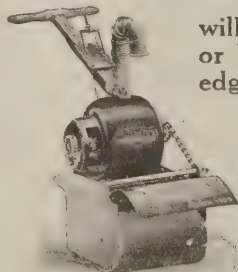
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Chicago Demonstrating Rooms:
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The IMPROVED Rapid Floor Surfer



will surface right up to the wall or baseboard without the use of edge-roller.

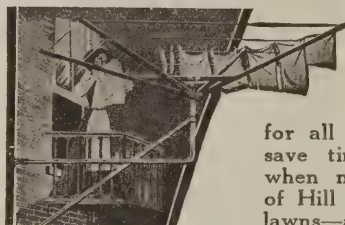
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Made in Several Sizes

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HILL CLOTHES DRYERS

for all kinds of houses. They save time and labor—fold up when not in use. Get details of Hill Dryer for balconies and lawns—also our Cabinet Clothes

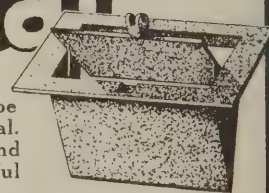
Dryer for laundry rooms of residences, apartments and institutions. The Hustler Ash Sifter is another convenience for the home. Send postal for Catalog N.

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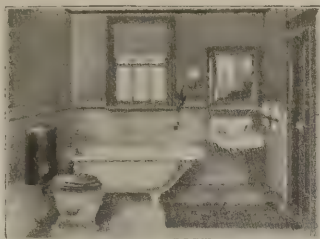
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Made in any size and style to suit your need. Reliable, up-to-date. Easy running—no binding, scraping or jarring.

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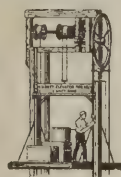


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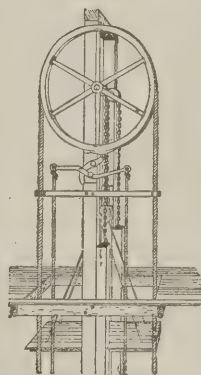
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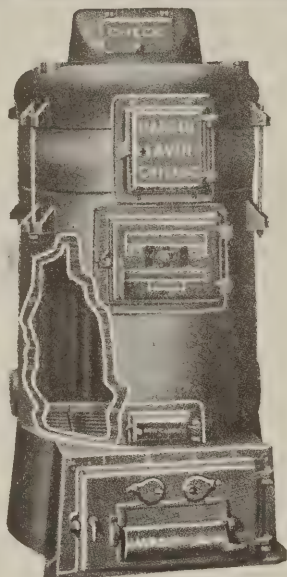
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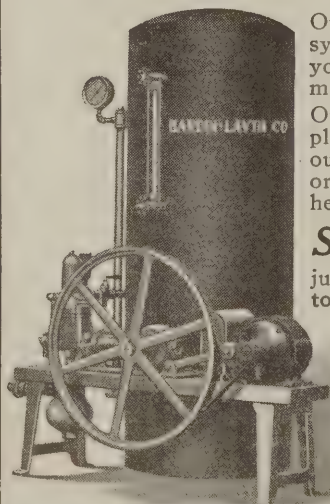
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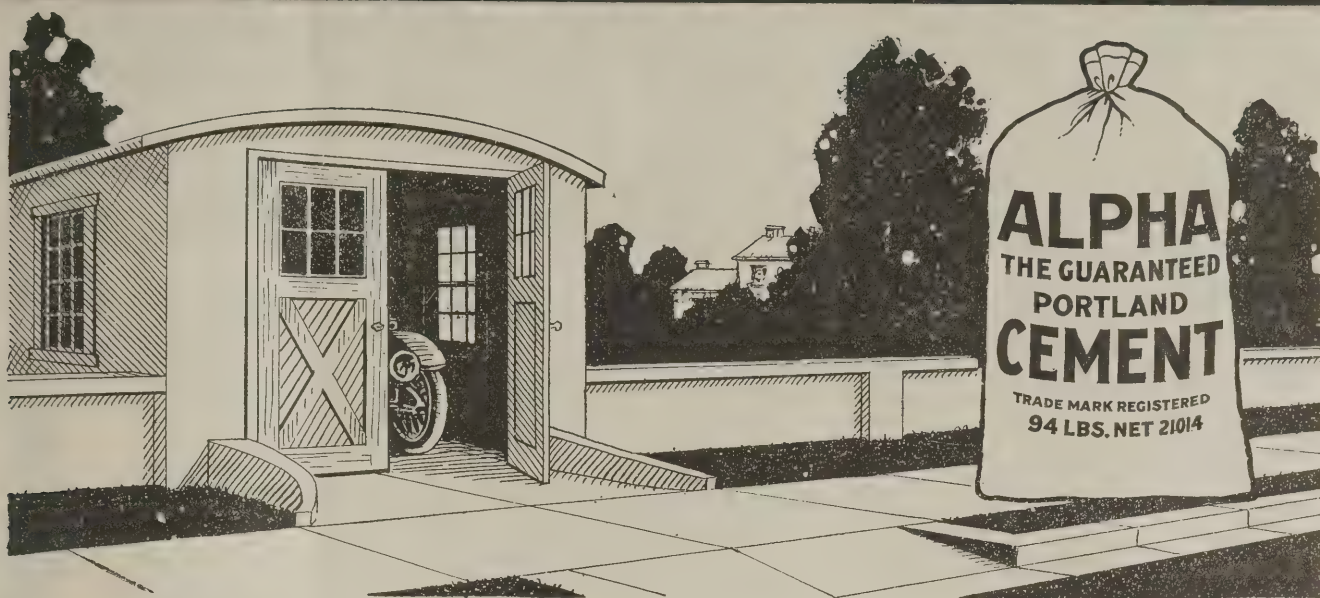
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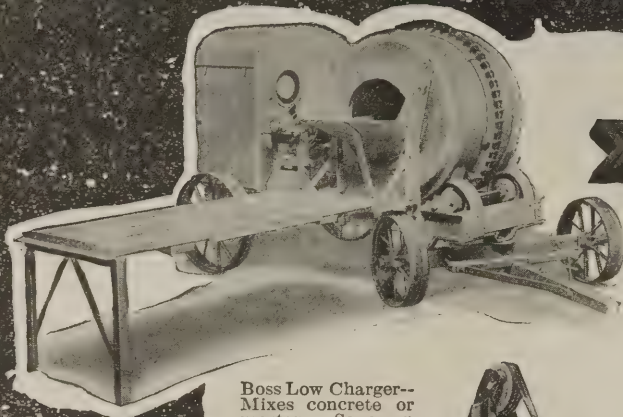
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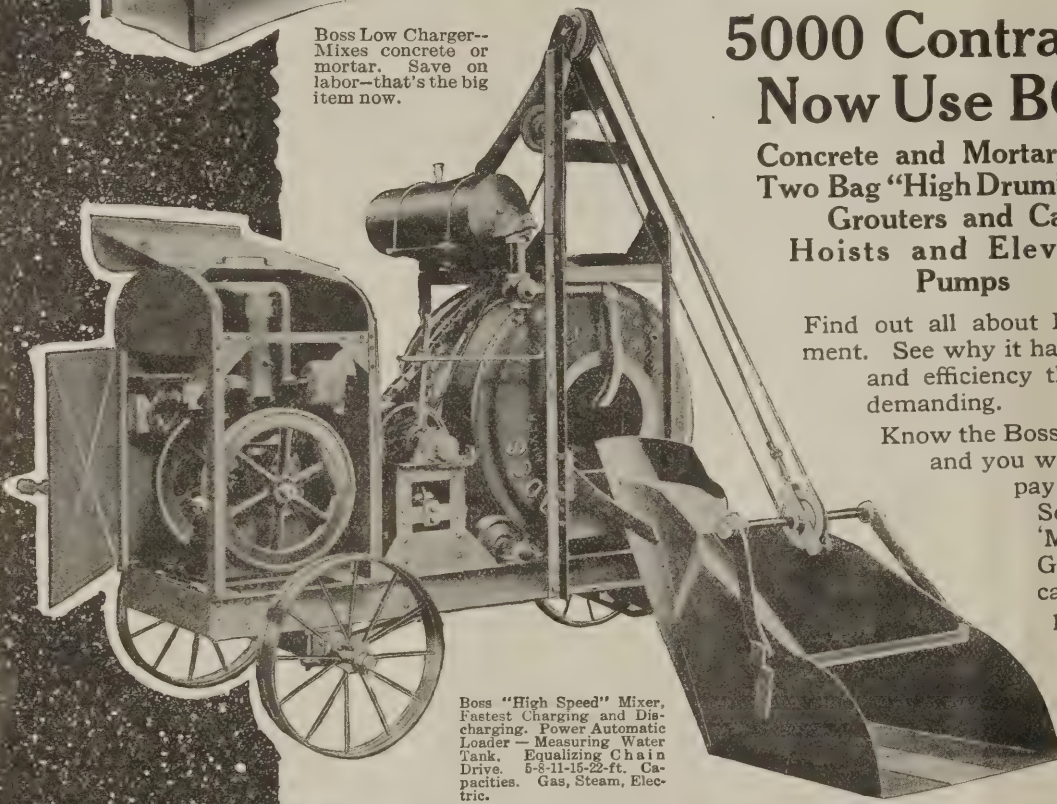
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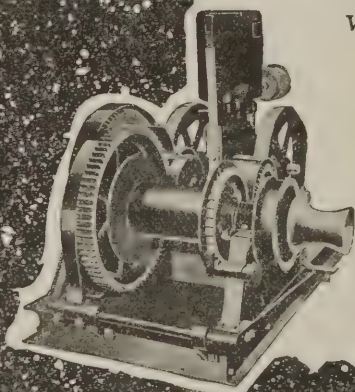
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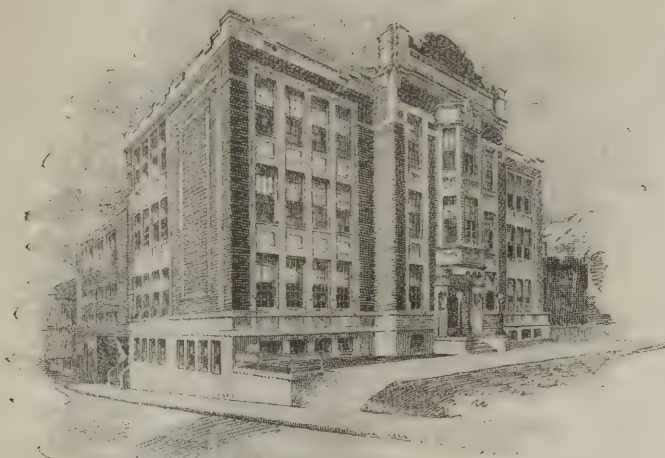
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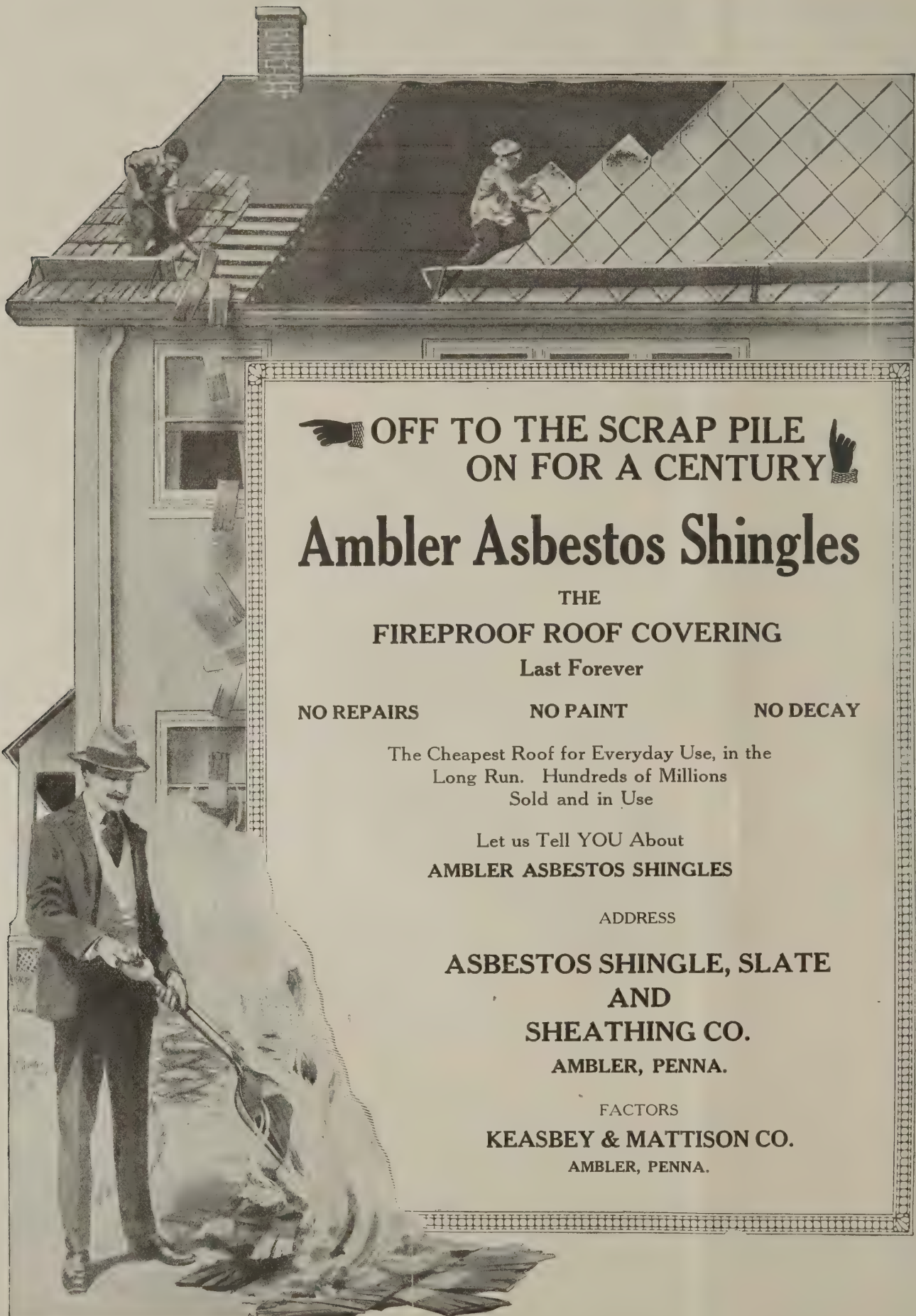
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

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This great hardness, stiffness and strength of UPSON Processed BOARD means less waste in fitting and handling. It also means greater ease and greater accuracy in cutting. It means that UPSON Board will not pull from the nails as do soft, spongy, weak boards. UPSON Board "holds" to the nails when other boards pull as the framework may shrink or settle.

If you UPSONIZE, you will leave behind a satisfactory installation that will build good will and new business for you.

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Send me your book, "WHY I BECAME AN UPSONIZING EXPERT AND HOW IT PAID ME"—showing how I can increase my business by Upsonizing—also a sample of Upson Board for inspection and comparison.

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Address

LOOK FOR THE BLUE CENTER



HOUSANDS of buildings in this country are sadly in need of new roofing. Repairing has long been delayed.

At no time has there been greater opportunity to profit by a real need. The roofing jobs are waiting for you. This business is yours if you go after it prepared to sell and apply Flex-a-tiles. WHY? Because Flex-a-tiles have every quality that enables you to make sales to **every building owner.**

The Flex-a-tile line completely answers every demand for Economy, Durability and Beauty. There's a Flex-a-tile style adapted to every type of roof.

Flex-a-tiles afford you a good profit. And we give you real cooperation.

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The Heppes-Nelson Roofing Co.

Dept. F

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Chicago



Flex-a
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Roofs-Everywhere



For the Man Who Sells and Applies Flex-a-Tiles

Flex-a-Tiles Sell Easily and Make Permanent Friends

Each Flex-a-tile product has Quality and Durability built into every atom of its construction from the strength of its basic foundation to its beautifully finished surface of red and green Vermont Slate.

Perfectly Waterproof and with great Weather Enduring qualities, this roofing stands the heat and cold—the wind and rain. Yet it is flexible and is scientifically made to be applied with greatest speed and utmost economy.

Learn all about Flex-a-tile Roll Shingle Roofing—a really artistic Shingled effect in rolls—the Flex-a-tile Slab Shingles—4 in one—and all the other members of this Quality Line. The man who handles Flex-a-tiles will have preference on roofing contracts.

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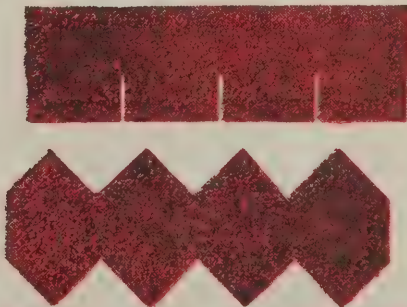
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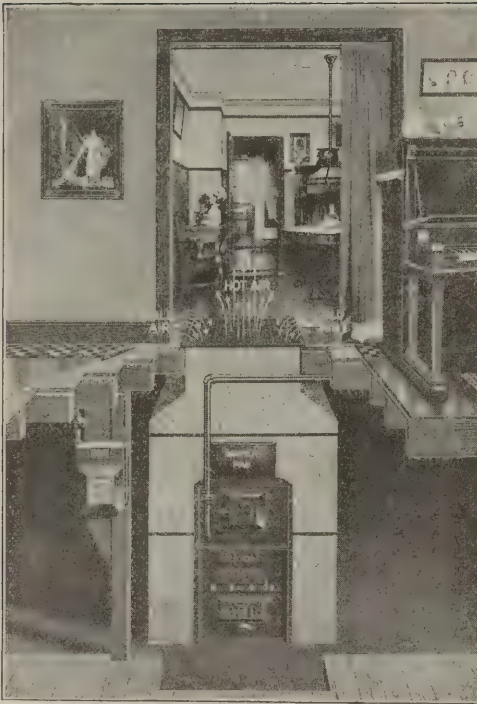
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Waterproof
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THE HESS

Pipeless Furnace

Warms the Whole House —With One Register

No horizontal pipes; no cold air ducts. The heat is distributed thoroughly and evenly; all cold air is drawn off the floors. Moisture (humidity) added to the air gives your home a healthful, summer atmosphere.

SAVES COAL—you can burn **ANYTHING**; the cheapest soft coal gives results equal to anthracite.

NEVER LEAKS, for all seams are **welded** and never open from expansion or contraction. The inside is smooth; no flues nor smoke passages to clog and prevent radiation.

We make **pipe furnaces** also; six sizes, for separate pipes and registers.

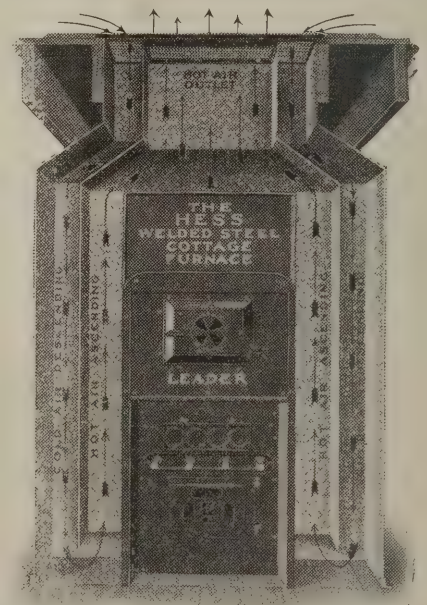
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Right now, the dull season, is the best time to buy. Lower prices, later, seem improbable, but if we should reduce our rates before October, we guarantee to refund, to all early buyers, an amount equal to any reduction we may make. Therefore, you are guaranteed the season's lowest prices on your early purchases.

Terms: Cash, Liberty Bonds or easy monthly payments. Send us a sketch of your house, for our estimate and our plan, showing the size and location of every detail required.

Our 48-page book on furnace heating is free. Let us send you one, and let us tell you, also, **how to burn soft coal and get FLAME and HEAT**, instead of SMOKE and SOOT.

Special rates to contractors, for resale. We sell to very many contractors, everywhere, and their repeated orders, year after year, are the best evidence of the success of our heater, and our direct-selling policy.



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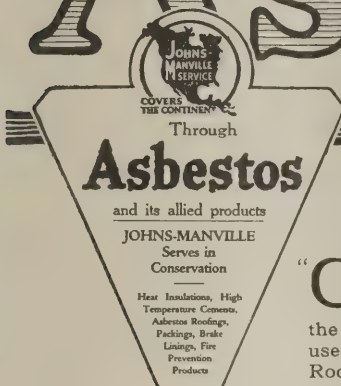
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ANNOUNCING JOHNS-MANVILLE Asbestone

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A Johns-Manville Asbestos Roofing at a Popular Price

"GIVE us a Johns-Manville Asbestos Roofing that will be within the price range of other ready-to-lay roofings." This has been the demand of the roofing dealer and the wish of thousands of roofing users, who believe in the superiority of an Asbestos Roofing.

Here is the answer to the demand, a popular-priced Asbestos Roofing in ready-to-lay form—Asbestone.

It is not a cheap roofing in the sense that its quality or its composition have been slighted. It is an inexpensive roofing, only because its manufacture has been planned on a big scale and its cost therefore is down to the minimum.

What Asbestone Is

Like all other Johns-Manville Asbestos roofings, ASBESTONE is a mineral fabric, composed of Asbestos fibre, cemented together with natural asphalts. Gray mottled Asbestic finish on one side, smooth black surface on the other. May be laid either side to the weather. Rolls contain all necessary fasteners for laying. Can be applied by anyone.

Asbestone defies time and repels fire. The varying degrees of heat and cold leave it unchanged, because being *all mineral*, there is nothing in it to disintegrate, dry out or rot. It never requires paint-

ing, and it will give years of service without the need or cost of repairs.

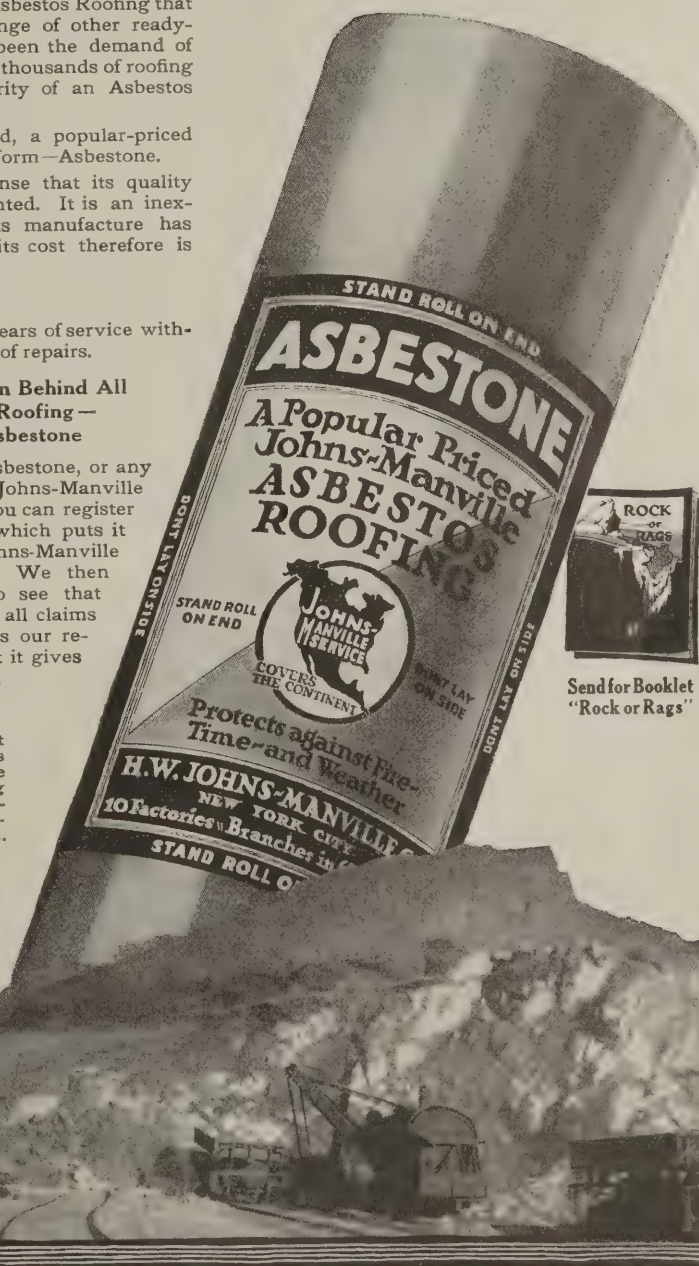
The Same Institution Behind All Johns-Manville Roofing — Vouches for Asbestone

Whether you buy Asbestone, or any one of the other Johns-Manville Asbestos Roofings, you can register your roof with us, which puts it on our records as Johns-Manville Roofing in Service. We then obligate ourselves to see that this roofing bears out all claims we make for it. It is our responsibility to see that it gives the service promised.

Other Johns-Manville Roofings

Johns-Manville Asbestos Roofings are made in great variety for all roofing needs. Johns-Manville Asbestos and Colorblende Shingles for homes. Johns-Manville Brooks and Flexstone Ready Asbestos Roofing for sloping roofs or large permanent buildings. Johns-Manville Built-Up Roofing for all flat surfaces, and Johns-Manville Corrugated Asbestos Roofings for skeleton frame buildings.

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New York City
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Twenty-five years on the market. Double the heating surface. Double the heat from fuel consumed. A complete and practically perfect Heating Plant for the best of homes. Every customer is a satisfied booster. This Furnace furnished with regular piping when so desired. Manufactured in five sizes suitable for any building from a **cottage** to a **church**.

Special manufacturer's prices to contractors
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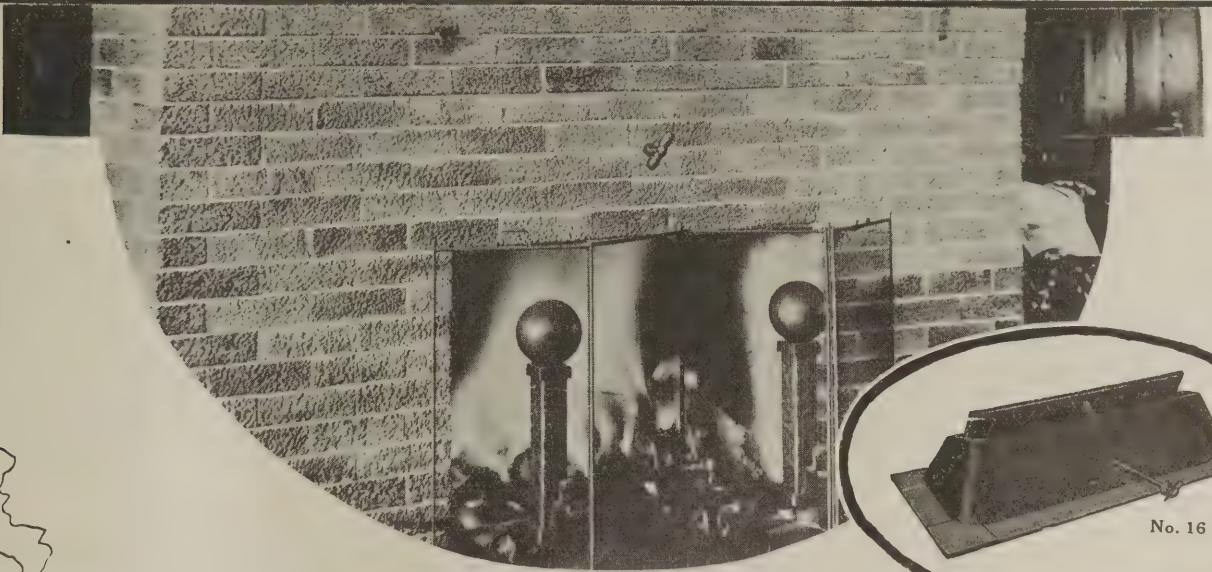
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Waterloo, Iowa

When the Test Comes



It makes little difference at the time you install the fireplace whether you include a good damper—or any at all. But when your clients have moved in and the first fire is made—that's when your reputation will be sizzled to a crisp if there isn't a

Stover Damper

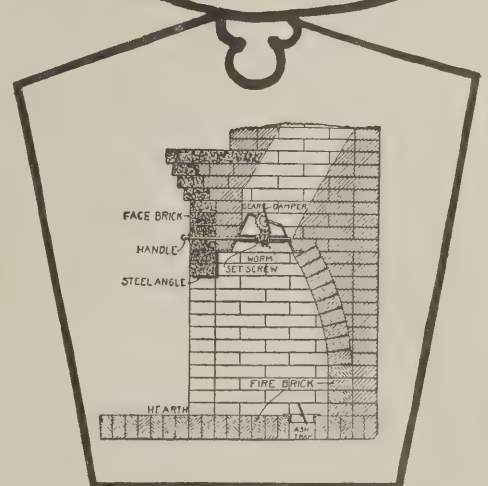
to regulate the fuel consumption and to keep out wind and rain.

Don't try to reduce the cost by leaving out a damper. It's poor policy. And if you use a Stover you will reduce the labor cost of

erecting the entire fireplace. It supports the brick work.

The price is low enough to permit installation in every fireplace. Made in several styles for any size opening.

Catalog 1954 shows our complete line of fireplace fixtures. Get it!



Manufacturers of Hardware, Wind-mills, Feed Mills and Gasoline Engines

STOVER MFG. & ENGINE CO.

35 East Street, Freeport, Ill.

Stover Mfg. & Engine Co., 35 East St., Freeport, Ill.
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SAVE \$1026



—Make That Same Saving on Every Six Jobs. What Would It Mean in a Season? In Ten Years?

These are not **paper** figures, but actual figures — these six jobs were actually built in Milwaukee and cost of concrete work was carefully checked up.

The actual cost of the concrete work with Reichert Metal Molds showed a saving of \$1,026.72 over the estimated cost of wood forms. The saving **paid for the forms**—and the forms will be good year after year. At that, carpenter labor was figured at only 70c per hour.

Make your own estimate of how much it would cost you to build the wood forms for these

same six jobs—prove this big money-saving yourself.

Send us your name and address and we will send you plans showing these jobs—no simple concrete work about them. We will send you actual figures of the cost with Reichert metal molds, and our figures on what the wood forms would have cost. You can check up this big money-saving to your own satisfaction—to your own big profit. Just write your name and address right in the margin of this page and send it on—we will know what you mean.

A saving of over a thousand dollars on every six jobs is too big not to investigate.

See Next Page

on the Concrete Work of These Six Jobs



—They Do Everything That Wood Forms Can Do—Do It Better and Faster

Builds a two-inch or a ten-foot wall. Builds any angle. Builds silos. Speed? Listen to this: A 20' 0" x 50' 0" foundation footing was laid Monday afternoon. Tuesday eight men started on foundation and by quitting time entire foundation was raised eight feet, with windows in place. Next morning the moulds were released for another job.

Sixteen men could not have had the forms built in the same time! Time saved—money saved—profits kept!

Reichert metal molds are simplicity itself—no complications—suitable for small jobs, as for big construction.

The plans, estimates and costs on these six jobs will open your eyes to the money you are losing. Write for them.

REICHERT METAL MOLDS

REICHERT MFG. CO., Inc., 1435 Booth St., Milwaukee



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Would a 20% Cut in Your Labor-Cost Interest You?

Joints **Rip-saws**
Bores **Jig-saws**
Sands **Bevels**
Grinds **Mitres**
Cross-Cuts **Rabbets**
 Tenons

OF COURSE it would! Then why not have it? An Eveready Saw Rig will cut the labor-cost on any job fully 20%, and many Eveready users write us that they save 50%.

Think what that means in these days when you have to figure mighty close to make any profit at all.

And an Eveready saves in dozens of other ways, too. You can work up the scraps that are usually thrown away. Make your own window and door frames. Do practically all of your own millwork. An

OSHKOSH Eveready Saw Rig

is light and easily moved, yet is strong enough to give a lifetime of service. Moved from job to job just as easily as the work bench. Two men can work on opposite sides of an EVEREADY at the same time—double efficiency.

A simple, sturdy engine furnishes ample power—and it never gets out of order.

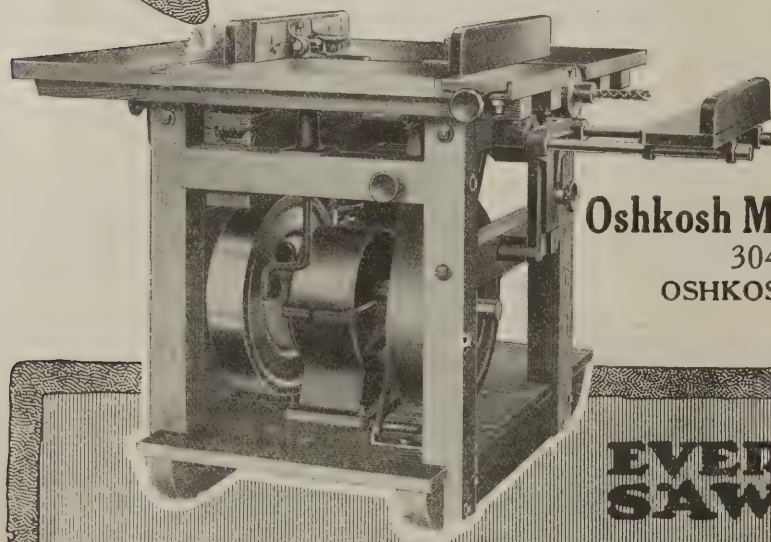
Performs eleven operations—does the work **when you want it done.**

Write today for descriptive literature and "Book of Evidence." Shows you how to double production without increasing the force.

Oshkosh Manufacturing Co.

304 Natic St.

OSHKOSH, WISCONSIN



**EVEREADY
SAW RIG**





Kawneer STORE FRONTS

The Thinking Builder Knows

that the eyes of pedestrians travel no higher than the store fronts. And that no matter how elaborate a building may be above the ground floor, it is money wasted if the store fronts are not equally or more than equally attractive.

For the same reason, he knows that an antiquated building may be modernized by simply substituting modern store fronts.

The Honest Builder Knows

that Kawneer Store Fronts are actually superior. Their superiority in beauty—is visible to the eye. Their economy is visible both in the price lists and in their long wear. Their popularity is equally apparent—by the fact that over 60,000 installations have been made.

Kawneer Fronts are made entirely of metal—copper or bronze. They are furnished complete from sidewalk to I-beam—the entire radius of the pedestrian's glance.

The Wise Builder Knows

that for reputation-building, the Kawneer installations are a tremendous aid. A pleased patron—who will advertise the builder by word of mouth—is invariably the result. And the Kawneer-equipped building is a monument to the builder's ability—one that he can point to with pride as "one of his jobs."

The Kawneer Manufacturing Company renders a complete service to builders. Write for Literature and new Catalog K

Kawneer Mfg Co. 1227 Front St., Niles, Mich.





You Can Identify Long-Bell Quality Lumber Products

THERE was a time when the average consumer could not specify and then identify the product of a particular lumber manufacturer. That condition no longer exists. The Long-Bell Lumber Company now trade-marks its lumber products. The Long-Bell trade-mark identifies products of uniform high quality. Our good timber, thirteen modern manufacturing plants, and the thorough supervision of every process in the production of Long-Bell lumber make our trade-mark—

Long-Bell

THE MARK ON QUALITY LUMBER

One of our products, Long-Bell Forked Leaf Oak Flooring, makes floors that are a source of pleasure and gratification; floors that are beautiful, durable, serviceable and economical. Long-Bell oak flooring is even in color and texture; superior in grade and manufacture. In our modern oak flooring plant the very latest type machine is used in surfacing our flooring. It was perfected under our supervision. By its use "knife" marks are eliminated from the face of the flooring. Because of this fact and the exactness with which the tongues and grooves are made, the remarkably smooth surface of Long-Bell oak flooring is unsurpassed. For permanently artistic floors, specify Long-Bell Forked Leaf Oak Flooring.

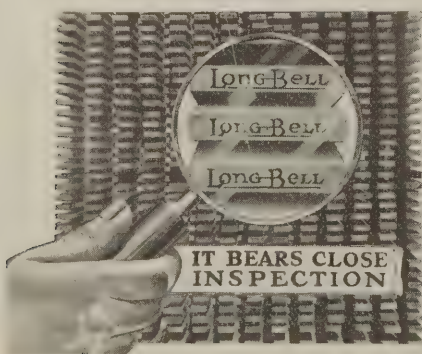
Ask your dealer for Long-Bell brand.

The Long-Bell Lumber Company

R. A. LONG BUILDING KANSAS CITY, MISSOURI

Manufacturer of Southern Pine, Hardwood, Oak Flooring;
Creosoted Lumber, Ties, Posts, Poles, Piling, Wood Blocks

This Long-Bell Forked Leaf Oak Flooring is shown just as it came from the factory. It has not been scraped, waxed or varnished. Note its beauty, even color, remarkably smooth surface. Modernize old floors by laying over them the $\frac{3}{8}$ -inch Long-Bell Oak Flooring.





"I Make Money Remodeling Store Fronts—So Can You"

Buy Direct From Maker

Selling store front construction to contractors for twenty-nine years has firmly convinced us that you prefer to buy direct from the factory—you profit by the direct service, and the money saved on even a small order is no small item. We have no branch offices, no road salesmen—you deal with the maker whose reputation for fair dealing is known by contractors all over the country.

Such an experience has enabled us to develop "Desco" construction so that you can easily sell it to your customers. It is easy to order, easy to install and the price is lower than you have been accustomed to pay for similar material.

High Quality; Moderate Price

"Desco" is simple—it is strong. The corner bar, for example, is reinforced with a heavy steel channel rust-proofed by the well known Parker Rust Proof Process. All bars and sash allow for a positive grip on the glass and permit of glass expansion, contraction and vibration. "Desco" sash provides for ventilation and drainage with large sized holes. The glass rests against creosote-dipped blocks in the sash which serve as a cushion. Glass breakages (both during and after setting) are very rare, and then only because of extreme carelessness. Many contractors and retailers say "Desco" is the best looking construction on the market. It is a complete construction, but standardized in such a way that you can easily and quickly decide what to use. Instead of making a large number of bars, sash, etc. (which are unnecessary and confusing) we make only what is actually needed to build good, permanent, strong and attractive fronts. As a user of store front construction you will immediately appreciate this simplicity.

You Sell at a Profit

We sell "Desco" construction to you at a discount that permits you to sell it to your customer at a profit and still save him money. To do this the quality positively is not sacrificed. We save you the profit and heavy expense of branch offices and road salesmen. This advertisement is our salesman which tells our story to you, and you in turn sell "Desco" to your customers. By this sales plan you make a good profit and are able to sell "Desco" at attractive prices. Remember, the Detroit Show Case Co. is favorably known in all parts of the country and enjoys the reputation of building only high quality store front construction and show cases. Every "Desco" front you install will be a credit to you, to your customer and to us. This is the practical way to sell store front construction—so let us work together. Here is your opening to a bigger and more profitable business.

**This is Your
OPPORTUNITY COUPON**

Desco
METAL
STORE FRONTS
A COMBINATION OF
STRENGTH AND SIMPLICITY
SOLD AT A MODERATE PRICE

Big Opportunity for You

Every indication points to the biggest store front remodeling season that you have ever had. Retailers everywhere, in large cities and small towns, are now ready to tear out their old fronts and put in modern ones. Are you ready to get your share of this profitable business? You are the ideal man to land those store front contracts in your city. The retailers and building owners know you, they have confidence in you and your work. What you say goes.

We urge you to fill in this coupon and mail it to us now—today. We will provide you with information about modern store fronts that will enable you to go out and line up some profitable contracts. We will give you drawings of various types of fronts—large and small—full size details and prices (with your discounts) of "Desco" construction.

Don't Wait

Spring always has been one of the best seasons to remodel store fronts, so don't wait until you have a job before getting our help. We've spent years gathering the information you need to do this work at a profit.

See Sweet's Catalog

Turn to Sweet's Catalog—pages 477-478-479-480 and study "Desco" construction. It's practical—every part—and is just what you need to use in your store front work. Architects in all parts of the country are specifying "Desco." Before you line up any jobs, be sure to send in this coupon.

DETROIT SHOW CASE CO.,
481 Fort Street W.
Detroit, Michigan

Gentlemen:

Without obligation please send me copy of "Book of Store Front Suggestions," full size details of "Desco" construction with list prices and special discount.

Name

Street Address

City

State

KELLASTONE

IMPERISHABLE STUCCO

THIS is the Age of Stucco—everywhere builders are sold and sold well on Stucco Construction.

Now is the opportune time to dominate this big business by specializing on KELLASTONE—the original, all mineral magnesite stucco that doesn't contain a particle of lime, gypsum, or portland cement. Get one KELLASTONE house completed and you then and there start an endless chain of profitable business.

KELLASTONE possesses exclusive talking points beyond number—every one vital enough to influence the most particular builder, whether it be a Home, Apartment Building, School or Church.

We have just launched our Nineteen Nineteen co-operative selling campaign. It is going big—ask for particulars—write us today.

National Kellastone Company
1316 Mallers Bldg. Chicago, Ill.



"Build it of Redwood!"

So says the discriminating Architect to his clients.

He knows that the *natural* preservative which has protected the "big tree" through the centuries makes its lumber enduring, and that its freedom from pitch renders it remarkably fire-resistant.

For mansion or bungalow — for every home-building purpose, except interior floors and stair treads — he recommends this wood from the age-old Sequoia Sempervirens of California.

"Build it of Redwood!" The Contractor, the Builder and the Engineer know its value, too. For bridge and tunnel timbers, for railroad ties, for telegraph and telephone poles, for block paving, for lattice trusses, for tanks and vats, and for all other exacting uses in contact with earth or water or under extreme weather exposure, they advise this long-lived lumber.

If you are not acquainted with California Redwood lumber, investigate its many exclusive characteristics.

The natural beauty of the wood; the readiness with which it takes stains when other than its natural old-rose finish is desired, and its freedom from warping, cracking or shrinking once it is seasoned — these are added qualities of California Redwood which make it an ideal building material.

You will make no mistake if you, too, say "Build it of Redwood."

Write for descriptive booklets covering the uses of Redwood in which you are particularly interested.

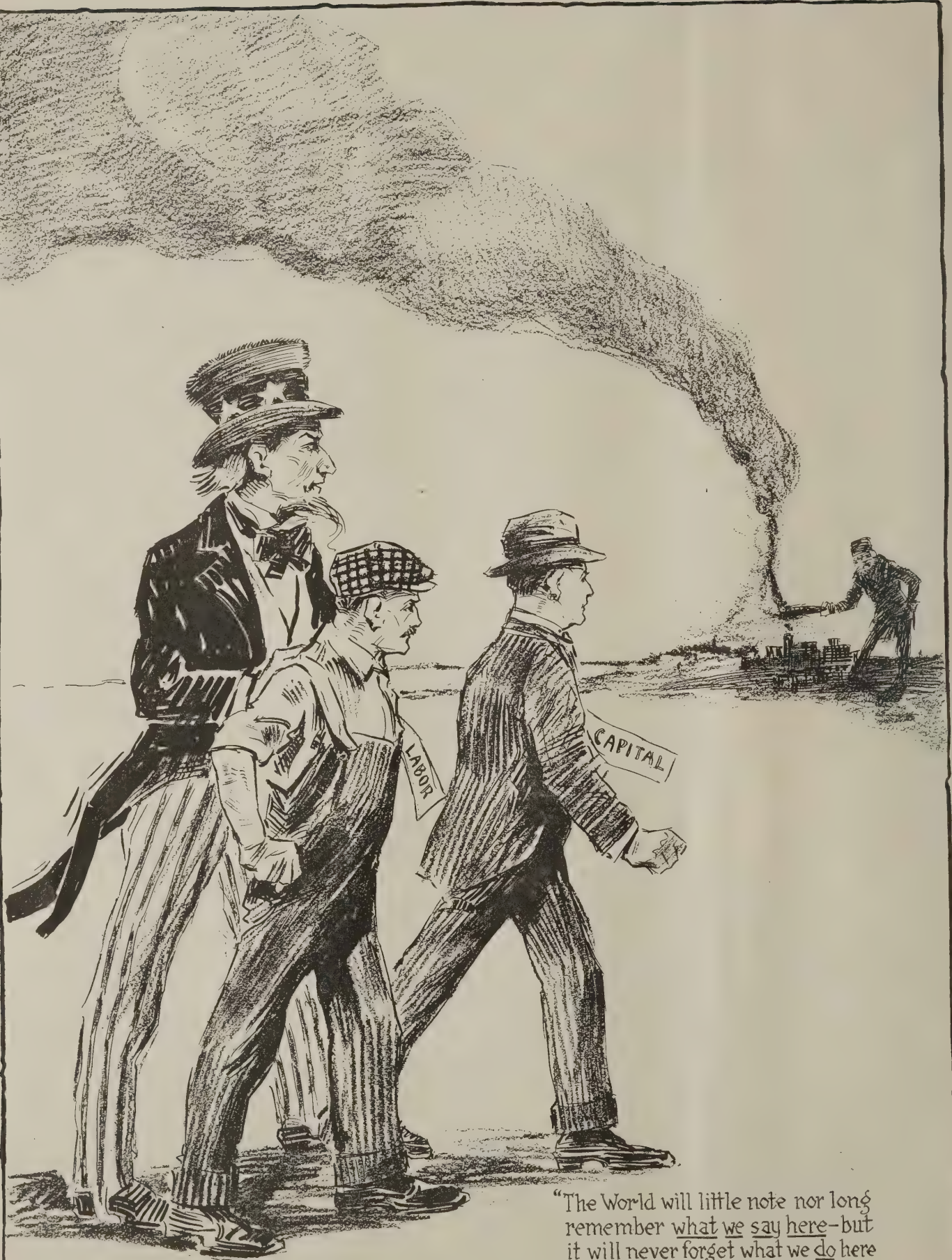
CALIFORNIA REDWOOD ASSOCIATION
722 Exposition Building, San Francisco, California

California Redwood

Resists fire and rot



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"The World will little note nor long
remember what we say here—but
it will never forget what we do here
—if we Build now."

Paraphrased from Lincoln's Gettysburg Address

ACLF

National Builder

Number 4

Chicago, April, 1919

Vol. 62

IF you cannot lower your own prices how can you expect the other fellow to lower his. The other fellow is waiting for you to lower yours. In point of fact neither of you can lower prices. You may agree to trim them a little after you have talked over how you can help each other, but in the end the law of supply and demand must send them up again.

The Industrial Trade Board recently appointed by Secretary Redfield is the body which is trying to get an understanding with the industries so that prices may be stabilized.

A great deal of the talk about high prices of building materials is misleading. You commonly hear that such prices are from forty to forty-five per cent above normal. Much depends on what is meant by *normal*. If by *normal*, 1913 prices are meant, there is some foundation for the statement. But records of the United States Department of Labor clearly show that for the ten year period 1903-1913 the increase in the cost of basic building materials—lime, cement, brick, tile, lumber and plumbing and heating supplies—amounted to 2½% per year, or a total of 25% for

the ten years.

If we now consider the six year period of 1913-1919, and assume that this 2½% annual increase is normal, it is clear that 15% of our so-called abnormal cost is really legitimate, and would in all have occurred almost inevitably war or no war.

Another thing, since January 1, 1919, average prices on basic materials have been cut to date—March 10—more than 10%. Add this to the 15% just accounted for and we have left an actual abnormal cost of 15 to 20%, and this is all that can be expected in the way of future price reductions.

But we have something else to consider. Even should this doubtful cut develop in the future, it is

very questionable if a drop in prices will be maintained for more than a few weeks. There is such a mass of needed construction being held up that when the work does start the material men and the manufacturers will be overwhelmed with orders. We will have the old laws of supply and demand again working to force prices up to new high levels, and building materials may cost even more than during the war period.

Those who think that by waiting a year or so much can be saved on building materials will receive a sharp disappointment.

What is meant by stabilizing prices?

In the words of Professor Irving Fisher, political economist of Yale University, our quarrel is with the general level of prices.

Variations in the general price level may be compared to the tides of the sea, while individual prices may be compared to the waves. Individual prices may vary from the general level of prices for specific reasons, peculiar to individual industries, just as the height and depth of waves vary from a general level established by the tide. The causes controlling the general

price level are as distinct from those controlling individual prices as the causes controlling the tides are distinct from those controlling the individual waves.

All prices have risen, but some have risen more, some less, than the average, for particular reasons affecting each industry. In some cases an improved organization of both employers and employees has enabled them to combine against the public and take full advantage of the price advance. The war brought about an abnormal demand for certain products like copper and steel, and they advanced faster than the average. The abnormal demand having disappeared, these prices are being adjusted downward.

In some cases, as in many of the industries making

**DURING THE WAR
IT WAS
PATRIOTIC
NOT TO BUILD**

Now we can best
show our patriotism
by building.

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

**CONSTRUCTION
ADDS
TO THE
WEALTH
OF THE
COUNTRY
BUILD NOW**

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

**Efficient
Work
Here**

will encourage
others to build
elsewhere

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

**Own
A Home
for your
Children's
Sake**

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

**SAVE YOUR
MONEY
BY
BUILDING
A HOME**

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

**I want to see
every
Wageworker
own his
own home.**

W. B. WILSON
Secretary of Labor

U. S. DEPARTMENT OF LABOR
W. B. WILSON
Secretary of Labor

building materials, the war meant a great slackening in demand, an enforced curtailment by government order. *In such cases we are likely to see an upward swing in prices as the suppressed demand makes itself felt.*

We are on a *permanently* higher level and the sooner the business men of the country take this view and adjust themselves to it, the sooner will they save themselves and the nation from the misfortune which will come if we persist in our false hopes.

The Industrial Board of the Department of Commerce is simply engaged in getting the waves as close to the tide level as possible—stabilizing them. But the average result will not lessen the average cost of building, for if some materials have too high a cost wave, others are in the hollow and will be leveled up—so it will be all the same to the man who builds.

Build now.

The Building Situation

By Allen E. Beals

These exclusive reviews of the business situation are prepared for the readers of National Builder from authoritative sources. They present the fundamental reasons for the immediate resumption of building activity

IN attempting to analyze the national building problem as it presents itself to the practical builder today, account must be taken of fundamentals in the absence of precedents.

* * *

Starting with the fact that this country, represented by 178 cities, is forty-six per cent. under-constructed, we have as the first premise the factor of assured demand. Under normal conditions such a demand would have been created by a financial panic or a period of great inflation of real estate values. In the present instance nothing of the kind has occurred. The dominant cause of the present shortage of rentable buildings of all kinds is due entirely to an artificial condition well understood to be the result of the exigencies of war. The demand is the direct consequence of the order to stop, which differs from economic estoppel of construction progress in that through proclamation demand is stifled, whereas economic estoppel is the result of absence of demand or manipulation of realty values.

* * *

In April, 1917, when this country entered the Great War, the country was only 3 per cent. under-constructed. In practically two years, therefore, building construction sloughed off 43 per cent., which is practically the percentage of decline of production of building materials not classed as munitions of war. In normal times, say, for instance, the year 1916, this country produced enough materials to make possible a national building construction program of about one and one-half billion dollars. Today, there is a potential construction program in this country, outside of engineering

work, of approximately two and a quarter billion dollars, with the building material production capacity of the United States, through heavy war-time depreciation, loss of labor and of market and Government requisition of stocks on hand, estimated to be barely sufficient to take care of \$800,000,000 worth of construction work.

When the builder's customer requests an estimate and then says the cost is too high and he is of a mind to wait for lower prices, he misses entirely the actual causes of the present day cost level, and he probably thinks that costs cannot continue to remain at the altitudes that now mark the building horizon. Did he ever know of a condition where demand was abnormal and prices were low? Has he considered that with building material production so abnormally low and a scarcity of commercial and industrial building so generally great, his postponement of present day construction will put him a year or two years hence more completely at the mercy of the high price level than he is today?

* * *

The plain fact is that construction costs as they are today are not the sole product of the war. The price advance began as far back as 1895. Taking the compound of common brick, cement, steel beam, window glass, yellow pine and lime prices for each year from representative centers of the United States, based upon the zone system of the Portland Cement Association, we find that the index figure, representing base prices for these building commodities were:

1895	\$ 35.85	1907	\$ 57.26
1896	35.04	1908	55.23
1897	34.92	1909	57.94
1898	39.35	1910	58.90

178 cities 48 per cent. under-constructed today

April, 1917, this country was only 3 per cent. under-constructed

More than two and a quarter billion dollars' worth of construction work to be done

Stocks and production equal to only eight hundred million

Customers who wait for lower prices will be at the mercy of higher prices later on

1899	42.35	1911	58.47
1900	42.88	1912	57.35
1901	43.04	1913	57.78
1902	43.82	1914	56.59
1903	43.90	1915	60.99
1904	45.39	1916	72.12
1905	51.61	1917	79.98
1906	58.32	1918	111.41

* * *

In no year in the foregoing table have there been conditions like those now existing. Note that in 1918, with the total volume of building construction going to permit in 167 cities of the United States totalling barely \$325,000,000, prices of building materials had their greatest inflation. The sole meaning of that fact is that building materials were so drained in supply and curtailed in their production so completely that they went to premium levels and the conditions that put them there have not yet been removed.

* * *

These conditions were two, capital and labor. Capital was withdrawn from building programs except for war winning purposes. The same was true of labor. The signing of the armistice did not free capital instantly any more than it has freed labor. Both were impaired in their usefulness. Capital is not freely available for building construction even today, four months after the signing of the armistice, because the Government still has a prior interest in its use for the flotation of one or more Victory Loans and for quick revivifying of trade calling for ships, docks and terminals rather than houses, apartments, stores and institutional buildings. Labor is not free to resume its normal function because it has not yet been entirely demobilized from the uniform or the war-time industry, and that part of it that has been freed is insistent upon war-time remuneration and conditions of labor.

* * *

Building material costs cannot be reduced, therefore, until capital and labor are released from the thrall of

war-time necessity. That cannot be accomplished until prior needs for these two commodities have been more fully met. Here and there will be gradually increasing infiltration of money and brawn, but there will be freedom of money before there can be full-flow of labor, because one of the most essential factors in the cheapening of building costs is the item of ordinary "wheelbarrow" labor. Here, therefore, is the real essence of the analysis of the nation's building problem of today.

* * *

In all the years represented in the foregoing table of price fluctuations there was a great quantity of cheap domestic and imported labor. Those laborers have grown old in the service of the wheelbarrow, the pick or the shovel and have graduated to the steam shovel, the industrial railroad and the pneumatic drill. As they have passed on their sons have taken their places at the throttle or the controlling lever and their daughters have jobs as stenographers or bookkeepers in the boss's office. During the war the unskilled laborer has disappeared. Many have gone back to their native homes since the signing of the armistice and the scenes around any custom house in any Atlantic seaport today indicate that others are sure to return to Europe, while a movement is on foot here to shut off immigration for four years.

Cheap labor is the greatest cause for cheap building material prices. High priced skilled labor, required to assemble this material, is higher priced than ever, and in the erection of a building the real cost of construction is absorbed nearly 75 per cent. by the labor item therein, not in the labor item as applied to the original cost of the board, bag of cement, bar of steel or barrel of lime; and just so long as there is an abnormal demand for building construction the cost of skilled labor on the job cannot be expected to go down, and neither can the prospective investor afford to wait for it to drop, for the longer he waits the less demand he will have and the less attractive will be his project as an investment proposition.

**Labor will never
be as cheap as
before**

WARNING

Some builders, who are better builders than economists, are telling their customers that "it is suicidal to build now." The facts given in the preceding articles are authentic—are true. Your government and your country are with you. Build now!

Why Don't You Build Apartment Buildings?

By Charles E. White Jr., Architect

THERE are not places enough to live in. People are being thrust out of houses to give possession to new owners. Families are shuttled about from one flat to another because rents are high. There are not enough homes to go round, by many thousands; there are not enough houses and not enough flats.

As one man expressed it recently, "It is no joke. I haven't money enough to build my own home and I'm driven from pillar to post because I can only get a one-year's lease; before the lease runs

They want a place to live. They demand utility and convenience. If not luxury, it is at least comfort they require. They can pay for it and they are going to get it.

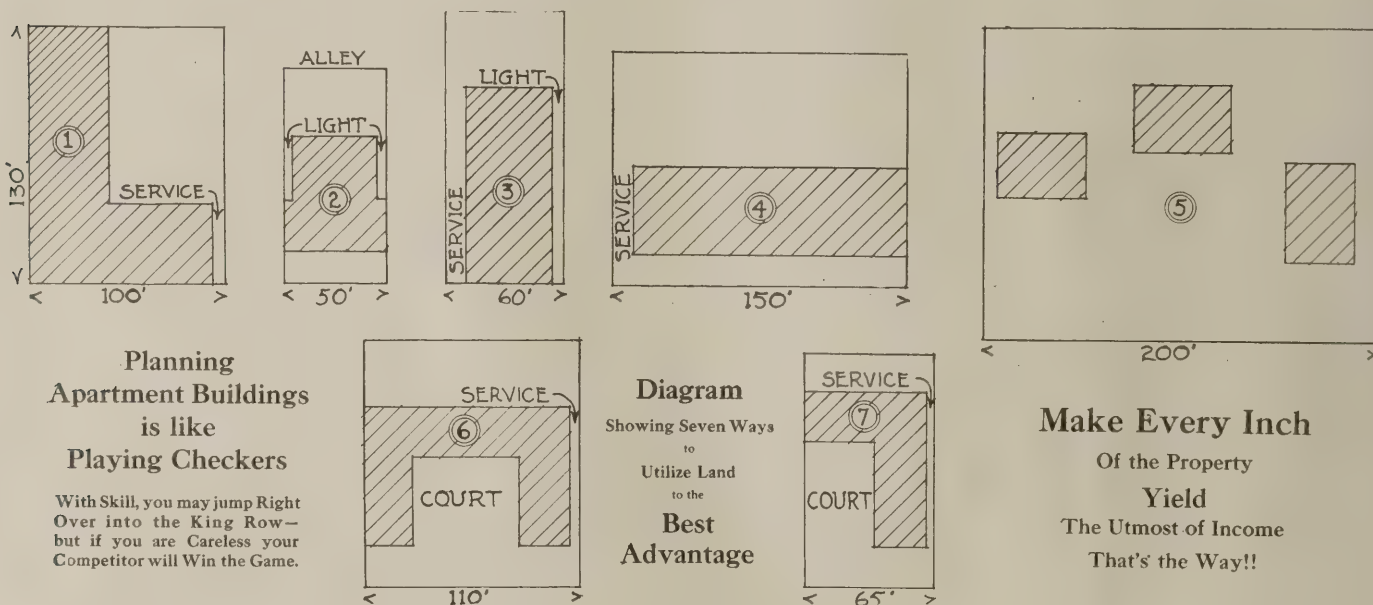
Are you going to build any apartment buildings this year to house this army of tenants? Are your plans all formed to go ahead? Have you considered this investment which is declared by bankers to be the safest even in normal times? Are you interesting capital in your town to take advantage of what is now really an abnormal demand for liv-

it yourself, sell it and let the other fellow improve it; otherwise you stand a good chance to be "land-poor"; money that ought to be invested in some live possibility is tied up in vacant property and you can't get it out.

Considering, again, the 100-foot lot. How would you improve it to make money?

First, you might build a house (or several houses) on it, and then sell out. If this is done with wisdom you can make a little money.

Second, you might rent the house or



out somebody comes along and outbids me, or somebody buys the property over my head and decides to occupy it. We move and move and move."

The United States Government stopped all building and now the United States Government is trying to start it up again. There is no bunk about it. *We must have homes, and have them quickly.* In those towns where this fact is not recognized there will soon be an exodus to towns where there are better living conditions. American people will not stand for old-fashioned living ideas. They have been educated to a comfortable, modern, clean and sanitary, convenient mode of living. During the stress of war they were not only willing but eager to stand any amount of inconvenience, but now the war is over.

ing quarters,—at the highest possible rents, consequently the largest possible profits to the owner?

A few minutes reflection will convince anyone why apartment buildings pay so well. Take, for instance, a vacant lot and consider it as an investment. If you hold it as a piece of undeveloped property, having purchased it when land was cheap to sell when values increase you may make a little out of it, but your profit is greatly diminished by the taxes you pay from year to year. Don't forget this fact *taxes jump with every increase in value* and your idle property costs you more each year.

Real estate men, bankers and operators all declare that in most cases the only way to make money out of property is to improve it. If you can't improve

houses and get a little income that way, in which case you would have to be careful that repairs did not eat up all your profits.

Or, third, you might build a flat building and get, from the same 100-foot lot, a much greater revenue than you could get from merely a few families in ordinary houses.

In other words, if you were in the business of renting bee-hives you would find that a small bee-hive with only a few bee families brings in less profit than a large bee-hive with a full swarm. So if you build on your vacant 100-foot a big human bee-hive for lots of human bees you will get a revenue not only from the ground area but from the free air above into which you project the upper stories of your building. If your

Fig. 1

This L-shaped building on a corner lot solves the question of biggest income from a given property, as it wastes little land and produces pleasant apartments. The corner flats have sun rooms and produce higher rents. There are no porches, as it was found that tenants would pay no more rent for porches.



Fig. 2

For an inside lot you may build a flat building like this, entirely across the front of the property. The service entrance is from the alley in the rear. Four apartments have porches and produce higher rent.

Fig. 3

An example of an inside lot on which space was reserved on both sides of the building for light and air. The service entrance is on the left side. Porches are provided for all flats because, in this case, porches increase the rental value.





Fig. 4

A large flat building in the suburbs. The walls are of red brick with cream glazed terra cotta trimmings. In plan, this is really two buildings placed side by side and attached. Often a building like this is built in two sections, the second half being built after the first is completed.

Fig. 5

The way it was done in a small town where land is cheap. Three separate flat buildings were erected on a large piece of property. They have always proved popular and a flat is rarely vacant.



Fig. 6

To build on three sides of a hollow square produces a very practical and artistic result. Tenants like the monumental effect of the hollow square with its iron balustrade and brick posts. The little fountain in the center, with lawn, shrubbery and flowers make of the court a little park.



building is three stories in height it will be the same as though you had three 100-foot lots, one on top of the other, so far as revenue possibilities are concerned.

How will you lay out your 100 feet (more or less) to get the greatest profit?

Examine the plots in the diagram, page 26; Figure 1 shows how you can build the building along the sidewalk and reserve the rear for air, light, back yard and back stairs. A service walk or little

On larger tracts of land such as are now frequently built upon in smaller towns there are many ways to operate and one way employed in a western suburb is pictured in Figure 5. Of course the large open space in front is wasted so far as real utility goes, but in small towns where land is cheaper the profit from a scheme like this is entirely satisfactory and the buildings harmonize with the community of homes.

One of the most recent developments

with gables in plaster and timber work somewhat along the lines of the modern home on a large scale.

Red brick trimmed with yellow brick and having a green or red tile roof can be employed to good advantage as indicated in Figure 1. Also, when the building is in a town or small city, a suburban character can be given the design by a judicious use of plaster and timber-work.

The matter of porches should be care-

Fig. 7

For a narrow lot the hollow square idea can be obtained on a very small scale by building along two sides of the property and leaving the other side open. The entrance to the court through the pergola is very effective and undoubtedly pays in dollars and cents. For every improvement more income is made, so you are capitalizing your brains and good taste, as you have a right to do.



alley can connect the street with the back yard; you will find that on many lots this is a good way to get the greatest yield from the property.

For an inside lot extending through to an alley study the scheme shown in Figure 2, showing a building which fits compactly between two other building lots.

Another plan for an inside lot is illustrated in Figure 3. In this arrangement the building is narrower than the building lot, a narrow space being reserved at each side for light and air. One of these strips is turned into a private alley to connect with the service entrance and make space for porches.

An inside vacant lot can often be made into a corner lot by merely building an alley or driveway at one side to get light and air to the corner flats and make an entrance to the rear of the building, as is shown in Figure 4. The policy of reserving a little strip of land in front for a front lawn is also a good feature, especially in the suburbs where lawns, trees and flowers are commonly used. Such a scheme makes your building more attractive; your tenants like it.

in the flat building line is the building constructed around three sides of a hollow square, with most of the apartments getting light and air from the entrance court. This has been found to utilize the land excellently and for small apartments proves very popular and most satisfactory. The court provides a very attractive entrance having a character quite grand, always admired by tenants. A scheme like this is illustrated in Figure 6.

Another recent development for a building with an entrance court in which not so much land is required is shown in Figure 7. Here the building occupies one side of a narrow lot, the entrance court being on the other side.

The kind of material to employ in apartment buildings built for investment is largely a matter of judgment; different locations demand a different handling of material and architectural design. For instance, in a small town where the building or buildings stand detached and are visible on all sides a plan should be chosen which presents a good side appearance, like the buildings illustrated in Figure 5. These are of red brick

fully studied along practical lines as it has been found in many localities porches do not pay. In other words, tenants in some cases will not pay enough more for porches to make the latter a good investment. On the other hand, some locations seem to require porches; tenants would not be without them and will pay more rent for apartments with porches.

A lack of porches can often be overcome by having living room windows extend down to the floor (French doors) with a little balcony rail in front. In the summer, doors can be opened and the living room made cool and comfortable.

In or near cities where rents are high and tenants numerous the tendency is to build larger buildings containing more apartments, but each apartment is smaller. In other words, with more families to house, the space allotted to each family is less. Thus the owner gets more profit from his property.

Wall beds, hung or pivoted, in living rooms and dining rooms make a two-room flat virtually a four-room flat, because the two rooms also take the place of two bed rooms.

A Small Housing Scheme

IF two men, not experienced in building, can organize a concern that builds 36 houses within a year, what is to keep any progressive builder from doing likewise?

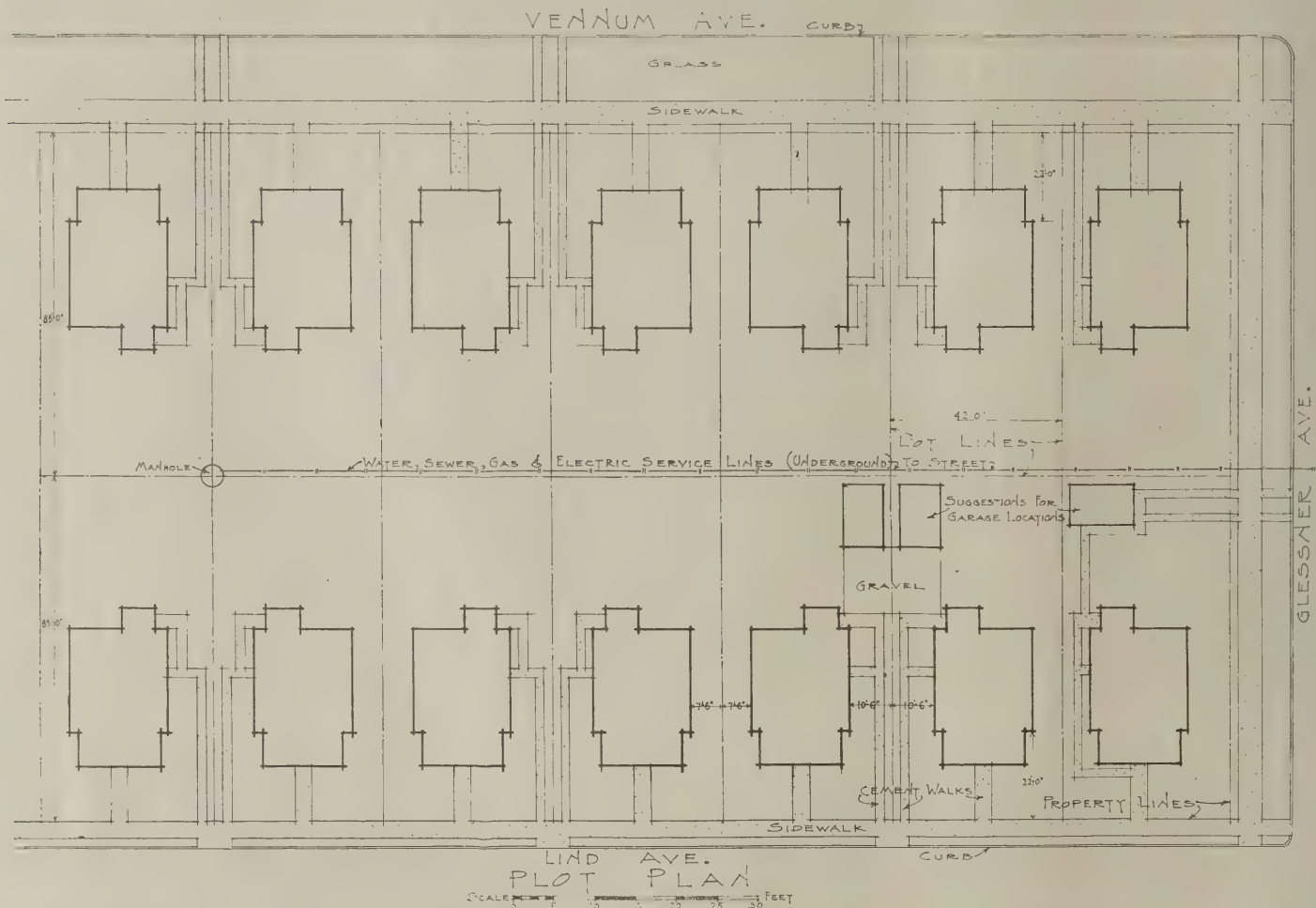
The concern that this refers to is the Buckeye Building & Realty Co., of Mansfield, O., and the organizers are C. S. Williams, formerly secretary of the Mansfield Chamber of Commerce,

by any progressive builder. Some will say, "My town isn't as large as Mansfield." For these we will use arithmetic; 36 new houses in a town of 28,000 people represents one house for about 750 people. Thus, for a town having 6,000 people, 8 new houses could be built, and so on for different populations.

Others will say, "My town was depending on war work, and our indus-

people to do work for him, whether on a 160-acre farm or in a steel mill, should take the tip from the housing schemes of the big industrial plants and do all that is possible towards getting his employees settled in a comfortable home. A man who has a pleasant home hasn't much inclination to go gadding around over the country.

The details of the organization of such



and G. A. Farrow, formerly in the insurance business. Mansfield is in Eastern Ohio and has a population of about 28,000 people.

The company was organized in the spring of 1918; was locally financed; began operations almost at once; and it has passed through the armistice period without slackening its pace. The company's building operations have been confined to its home town, and it carries out the entire developments; buys the land; builds the houses, and sells them.

Now, to return to our first statement. There should be no reason why this sort of proposition can't be put through

tries are now crippled." Mansfield was also doing a large amount of war work, but this building development kept pounding right along and refused to be influenced by such conditions.

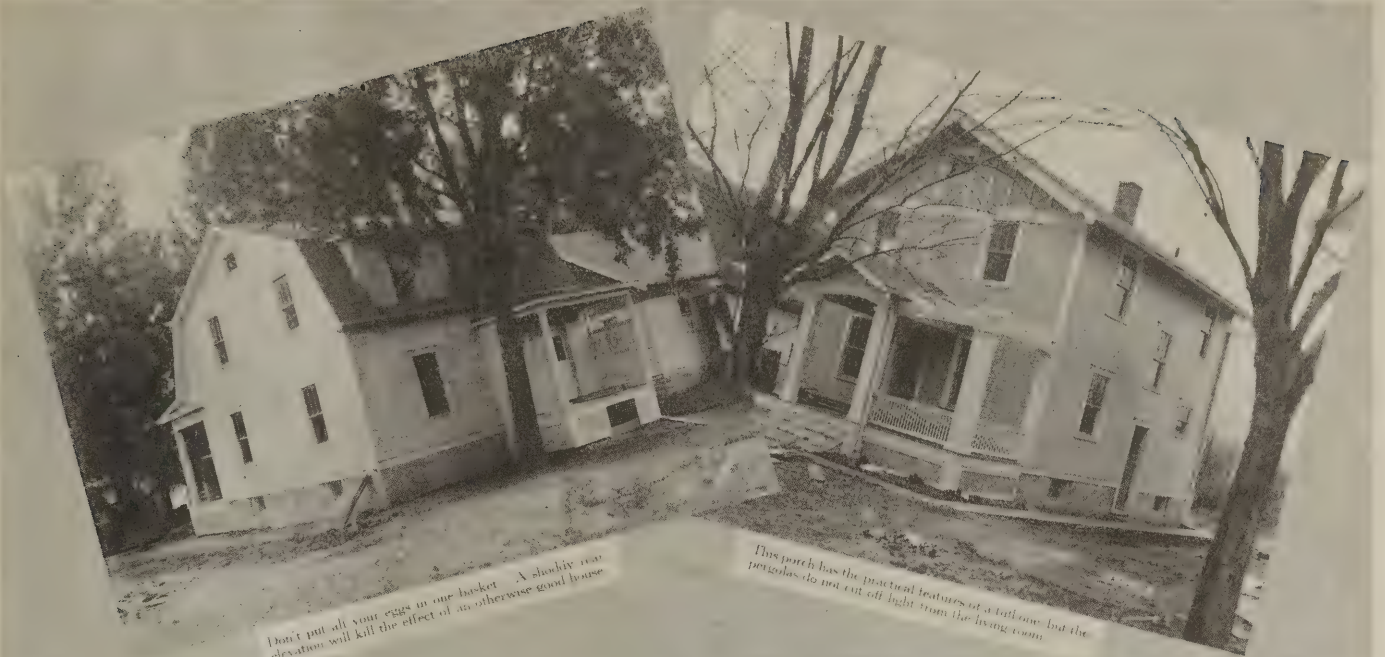
You may say, "There isn't any market here for new houses." Now, that's the poorest excuse of all. Nine people out of ten, who pay out house rent, are prospective customers. All that has to be done is to show them how easy it is to pay for a home of their own. You could sell houses tomorrow if you had them ready.

The question of financing an operation of this sort depends on the local conditions, but any man who employs

a company are not difficult to understand and the U. S. Government's newly created Division of Public Works and Construction Development at Washington, D. C., will be glad to offer suggestions for the formation of such an enterprise.

The building scheme for such a development should be simple and practical, and the layout about to be described has both of these merits and can also be easily adapted to suit the needs of most communities.

The operations of the Buckeye Company were not confined to any one piece of ground. Some of the houses are on isolated lots while others are grouped



Don't put all your eggs in one basket. A slightly rear elevation will kill the effect of an otherwise good house.

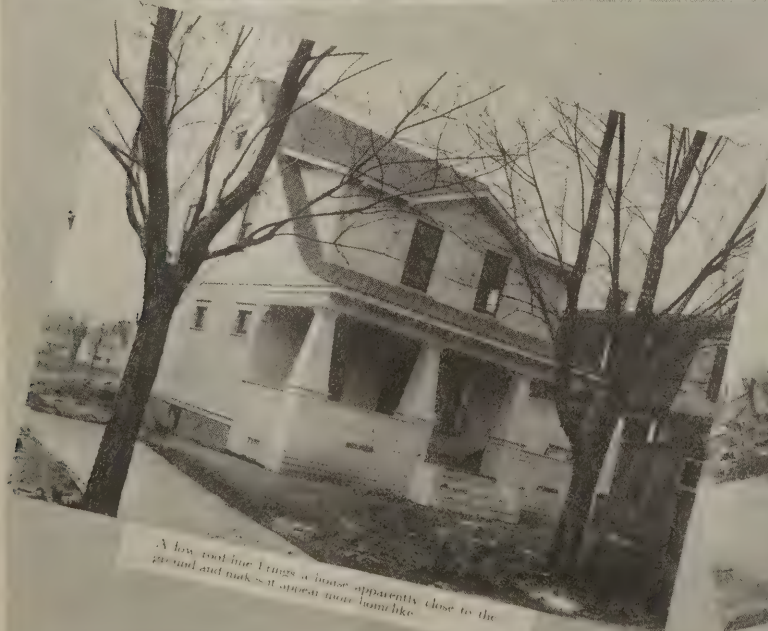
This porch has the practical features of a full one, but the pergolas do not cut off light from the living room.



A study in contrast. Very dark trim against white. It should be a statement of a 'happy' effect will result.



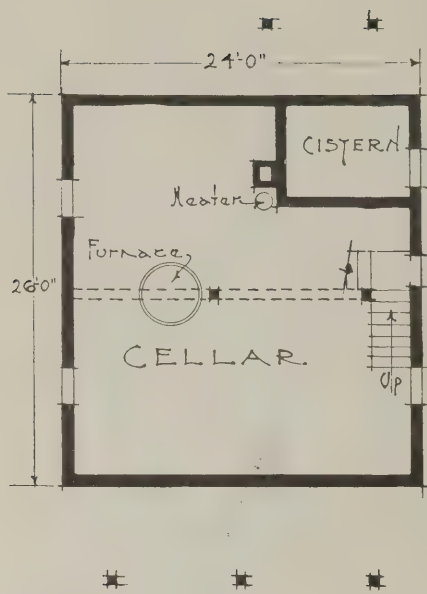
The Gambrel Roof Type is popular because it allows almost all of the roof space to be used for bedrooms.



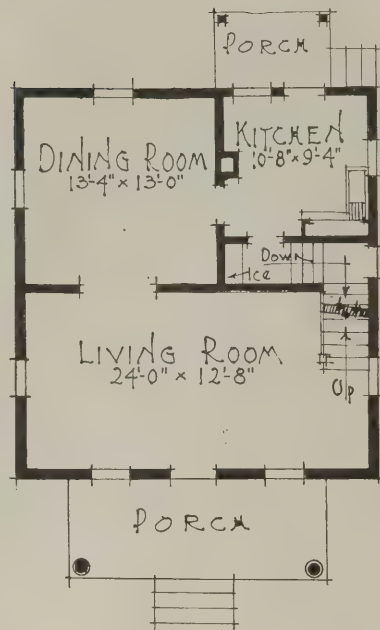
A low roof line brings a house apparently close to the ground and makes it appear more home-like.



All of the houses will have porches of the same height. This makes a harmonious group.

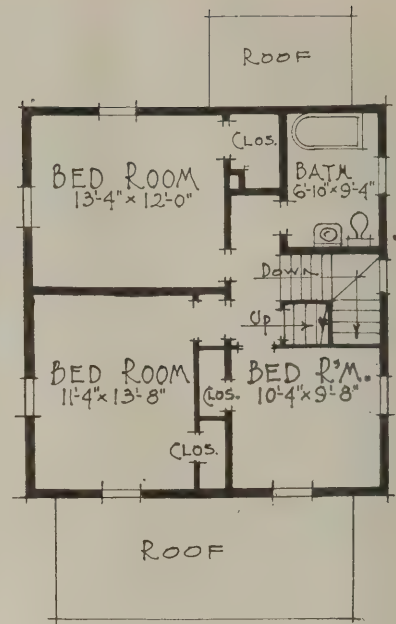


BASEMENT



1ST FLOOR

SCALE 0 2 4 6 8 10 FEET



SECOND FLOOR

The front porches vary in type, giving variety to the designs. The cisterns are 5 feet 6 inches high and have a wooden cover. In some houses the attic stair is replaced by a linen closet

together. The group chosen for this article contains 14 houses that were under construction at the same time.

The Plot

The plot has a street frontage of 293 feet; is almost level, is well drained, and lies between two parallel streets. The houses are ranged in two rows, each row facing a street. The water, sewer and gas service mains are laid in the rear of the houses, in the middle of the space between the rows and the service branches are taken off both ways. The electric wiring is also run here in an underground conduit, thus unsightly poles with wires running every which way are avoided.

A very good feature is the arrangement of the walks between houses. By simply reversing one of the plans, a

pair of rear entrances are brought to face each other, and the sidewalks to serve these entrances are run side by side. If an owner desires to build a garage in the rear of his lot, he has only to extend these walks a few feet to have a cement auto drive.

The Houses

The houses contain 5 rooms, bath and basement; have front and rear porches and roomy closets. They have gas and electricity, and are heated with furnaces. Some of them have finished attics.

They have built-in features such as mantels, book cases, seats, clothes chutes, kitchen cabinets and medicine cabinets.

The Elevations

The difference between these houses is altogether one of external appear-

ance. The plans are exactly similar and the variety of types is wholly obtained by a change of porch detail here and a different roof treatment there. Nobody nowadays wants to live in one of a row of houses each of which is exactly like its neighbor, and houses that are built to sell must rely to a great extent on their outside appearance.

The Construction

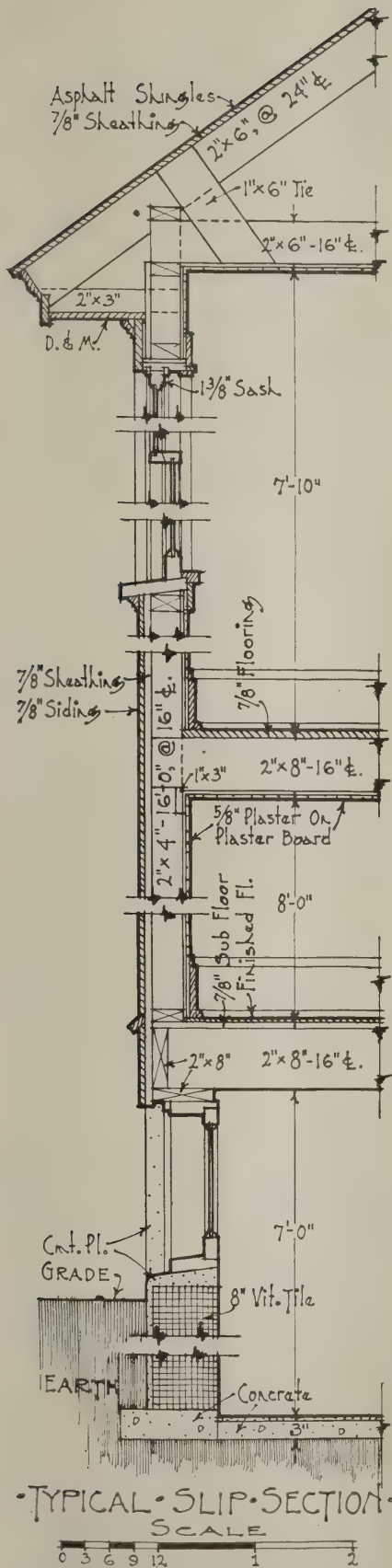
All framing and outside woodwork is yellow-pine. The foundations are of vitrified hollow tile 8 inches thick, laid up in cement mortar and plastered on the outside with cement plaster. The roofs are covered with asphalt shingles of three different colors, one roof is green, one red, another gray, and so on, to get variety. The interior plaster throughout is laid on plaster board.



The different types of roofs give variety to the houses without changing the general floor plans.



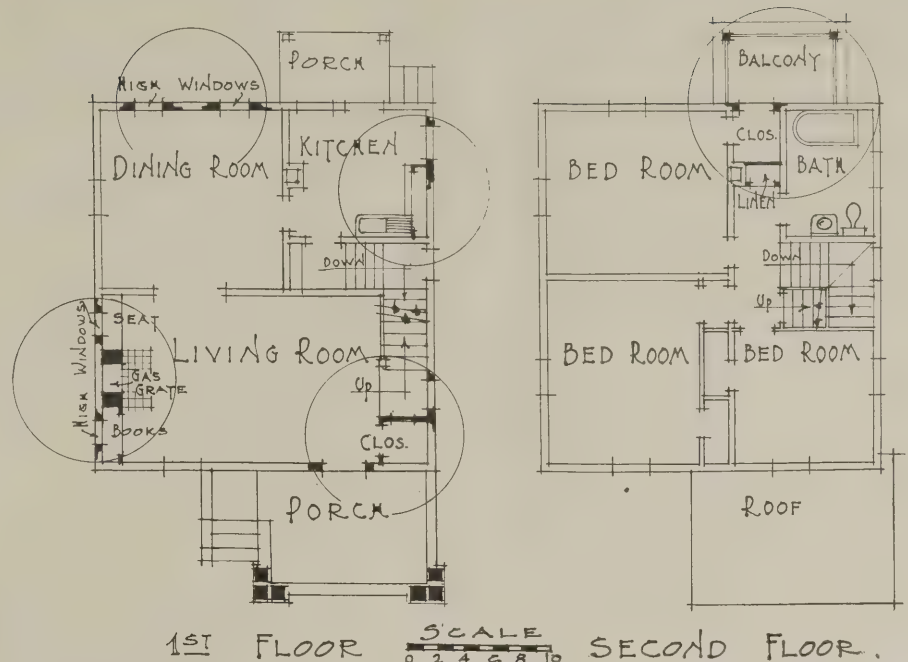
It doesn't take long for a force of builders to turn a vacant block into a community of homes.



Illustrating the general construction followed for all the houses

Plans

The same general plan is used throughout the development, but slight rearrangements of windows, doors and built-in features are made, to conform



These plans illustrate changes that are made to suit different buyers. They do not alter the general plan scheme

to the ideas of buyers. The unimportance of the changes that have been requested show that the general plan is practical and that it satisfies people of varied tastes and ideas. The combination grade line entrance at the side is a good feature and the entire plan is compact and conveniently arranged.

Interior Finish

The interior plaster has a sand float finish except in the bath rooms. These have had plaster wainscots 4 feet high marked off in 3x4-inch blocks.

The floors in the living rooms and dining rooms are of white oak, the other floors are of pine.

The interior trim is of gum wood, natural finish to bring out the grain. The doors have white pine stiles and rails and 3-ply veneered gumwood panels. All gumwood was backpainted with white lead and oil and it has given no trouble. Its cost including backpainting was about the same as for pine.

Features

All of the fresh air for the furnaces is taken from inside the houses by means of floor registers in the living and the dining rooms. This is no doubt a coal saving arrangement, and it is contended that enough fresh air enters through cracks around doors and windows to give good ventilation.

The cisterns in the basement are for the storage of rainwater from the roofs. They are of 70 barrels capacity and are calculated to store a supply of soft water sufficient to last through a prolonged dry spell. In the first houses, pitcher pumps at the kitchen sinks were used to raise the water from the cisterns. This method was not entirely satisfactory, so in the later houses a

pneumatic system was substituted for the pumps, thus the soft water is available in the bath rooms as well as in the kitchens. These pneumatic systems are operated by water motors and the entire equipment amounts to but a little above \$100 per system.

The balconies above the kitchen porches are a convenient place to shake rugs, air bedding, etc., and are a practical feature that will appeal to any housewife. The corner posts are extended high enough to allow a clothes line to be attached to them.

PAINT YOUR SCREENS

The time is fast approaching when the fly swatter will have to be rescued from its winter hibernation; also the fly screens will have to be fitted up for their summer service. What would we ever do without the swatter and the screen?

But it wouldn't be so necessary to "swat the fly," but the mosquito and chase the festive bug if the fly screens were protected from rust by an application every spring of good screen paint; neither would it be necessary to buy new screens so often. It is merely another case of a stitch in time saving nine; only in this case it is a few cents' worth of paint saving several more cents' worth of new screen and the bother of putting it on the frames.

But a real screen paint should be used. An ordinary house paint merely stops up the holes and generally gums up the screen. We might as well have our screens look decent; we might as well be able to see through them while protecting them; a special screen paint is the answer. It costs no more than the wrong kind.

Building Chimney Stacks With Brick Cement and Stone

By John Y. Dunlop

ONE of the most important features of the British home is the open fireplace, which, when properly arranged, is not only a cheerful means of warming a room but is also an excellent ventilator.

The perfect fireplace depends very much on the arrangement of the flue which to be efficient must be able to

maintain a continuous steady but not too strong up-draught.

Attaining perfection in chimneys is, like many other points in construction, somewhat difficult, and much depends on careful design and careful workmanship.

Since the fabric used in house construction in Britain is mostly of a fire-

proof nature, buildings are arranged with their fireplaces and flues in two distinct ways.

First, with all the fireplaces on the external walls, and secondly, with the fireplaces grouped in the center of the house so that the flues and chimney stack pass through the roof near the ridge.



Brick chimney with stone
cope, showing special
chimney pots to cure
smoky chimneys.

Chimney
built in
concrete
with ce-
ment cotes



In the first instance flues built against external walls are often chilled by low temperature of the outside air with the result that the draught is often stopped or somewhat retarded. Hence flues are best arranged in a central position.

Where the flue is necessarily built against an outside wall the thickness of the wall at the back of the flue should be made as thick as is practical.

An addition which can be made to external flues is to line them with fire

possible as a large space over the fire-place causes the fire to burn sluggishly for some time after it is lit.

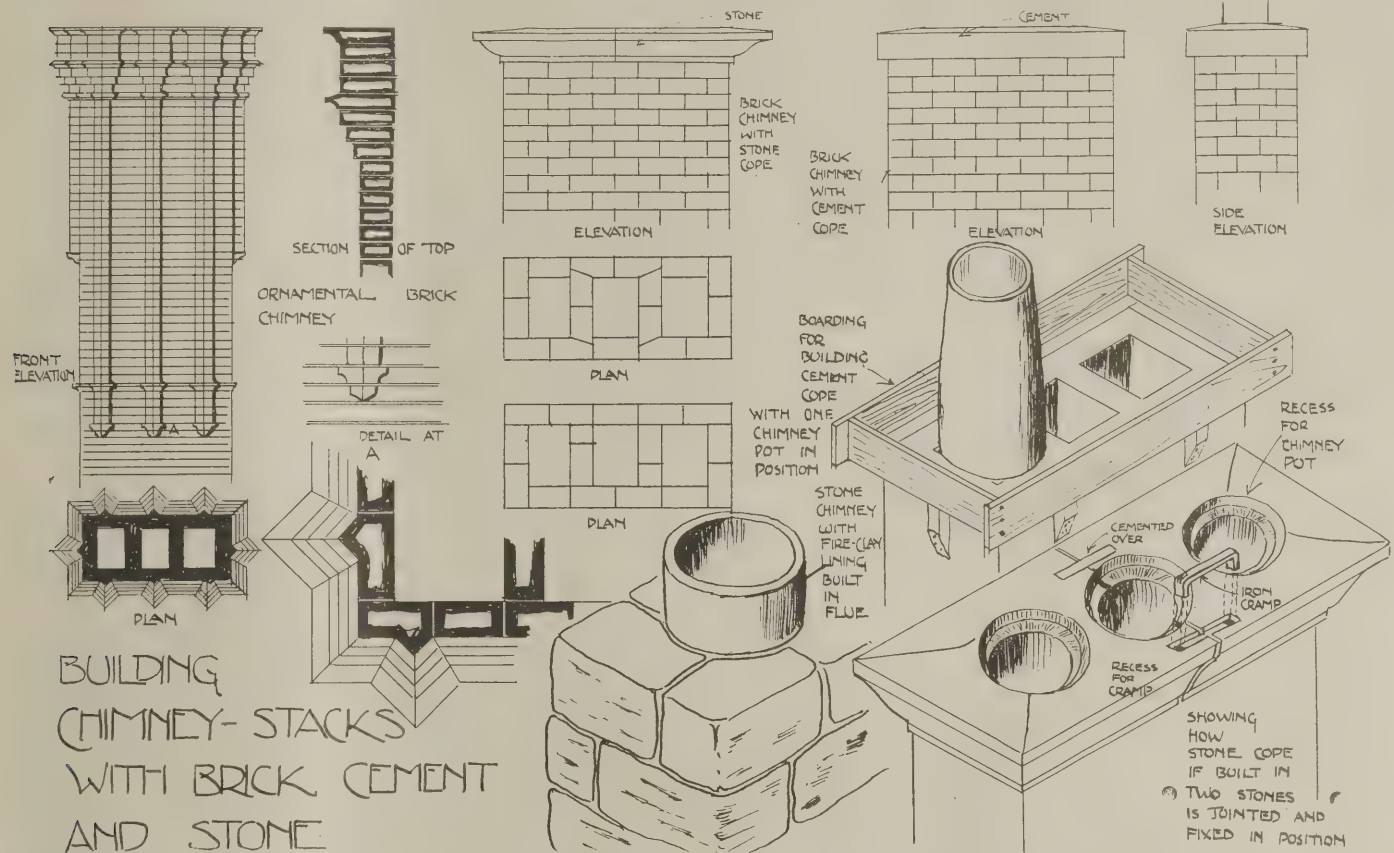
Usually the bricklayer, immediately the top of the fireplace is reached, corbels the next course over on each side, and, first before bedding the course in position, the bricks which project inward to form the gathering are splayed off neatly with the trowel.

In that way the sloping surface which joins the sides of the fireplace and the

preventing the heat in the flue from passing through some of the scamped joints and finding its way outside.

This is to my mind one of the greatest advantages of fire clay lining if the cavities between the lining and the brickwork or masonry are filled with grout.

Where this lining is not used the flue must be carefully pargeted (coated) with lime mortar and all the angles neatly rounded. This helps to keep the flue clean, reduces friction, lessens the risk



clay tubes similar to what is shown in the stone chimney in the line drawings. The best place for a chimney stack is on the ridge of the roof.

The slope of the roof not far from the ridge is also good but the apex of a gable and the eaves of a roof are both bad.

I do not mean that all chimneys in such position will give serious trouble, but that chimneys under certain condition so positioned will be smoky chimneys.

Such chimneys when overtopped by a building, a tree, or a high piece of ground in close proximity are sure to smoke when the wind is blowing over the obstruction.

Another very important point in the successful flue is its formation just over the fireplace.

The fireplace may be anything from four feet to one and a half feet wide and in that case the flue being only nine inches wide requires to be gathered over the fireplace.

This gathering should be as short as

flue proper is cut to form an upward sloping circular surface.

Of course all flues are not gathered equally on each side. Very often where the flue may have to pass a fireplace, say on the next floor, the gathering is formed almost wholly on the one side.

This formation of a slight change in direction is an advantage, as a perfectly straight flue will draw more strongly than a curved one but it is more liable to sudden gusts of down draft.

On the other hand long and sinuous bends must be avoided especially if the curve is any way near the horizontal as the friction of the smoke is very much increased and there is danger of the lime coating of the vent being scamped, and even if well done, it drops off in quite a short time.

The flue should not be too large and for ordinary household fires 14 inches by 9 inches is large enough.

Fire clay linings which are made in Britain in circular, oblong and square with circle corners increase the draft of the chimney by reducing friction and

of fire, and of the smoke escaping and finding its way into other apartments. The flue must be unobstructed throughout its length.

One common cause of an obstruction is the bad bonding of the flue divisions with the brickwork in the front and back.

Very often in carelessly done work there is no bond at all and should a brick become displaced it would mean that two flues would be crippled as both apartments from which the flues lead are liable to receive smoke from either one or the other fireplace.

This is called back smoke and is one of the dreaded complaints which open fires are subject to.

In the line drawing a simple way of bonding these partitions is shown without a great amount of cutting.

When the walls surrounding the flue are 9 inches thick instead of the usual 4½ inches there is no difficulty in obtaining good bond but with thin walls much neat cutting is required.

Frequently in stone chimney stacks with brick flue divisions no attempt is

made at bonding the partition. This, of course, is a bad arrangement and if the thickness of the walls of the flue will allow it a safe plan is to line the flue throughout with brick.

When ornamental brick stacks are built on the lines of that shown in the line drawing and the half tone illustra-

tion, flat surface at the top of the chimney stack on which the wind strikes and swirls.

To obviate this the simplest plan is the addition of the short chimney pot on the top of each flue which is generally in use throughout Britain.

especially when the fire is large and burns freely.

In this case the air is not supplied in sufficient quantities and in consequence there is a downward current formed in the chimney to supply the deficiency.

Owing to the same cause, want of air,



Ornamental
brick chimney
stack on the
outer wall
of house.

Brick chimney stacks
arranged to rise in
the center of the house.

This can only be done
when the fireplaces are
back to back and above
each other



tion, specially moulded brick must be obtained, carefully designed to give proper bond.

Short flues are very apt to smoke, a fault often remedied by the raising of the chimney stack or fixing a tall chimney pot on the top of the stack.

Building bylaws often insist that every chimney stack must be carried up at least 3 feet above the highest point from where it leaves the roof, but the height given is in many cases not sufficient. To my mind the chimney should be carried higher than the ridge of the roof.

Each flue should also be finished with something above the level of the chimney coping, because when the flue finishes level with the top of the cope the smoke from one flue often finds its way down the nearest chimney not in use.

This, of course, is largely due to the

Where the rooms are very small chimneys often smoke when heated by an open fireplace, even when the fireplace and flues are of good construction.

If the smoke comes into the room when the doors and windows are closed and flows freely when they are open then the descent of the smoke is caused by a want of air coming into the room to supply the current up the chimney. Contracting the throat of the chimney or placing a narrow mouthed pot on the stack will often cure this defect.

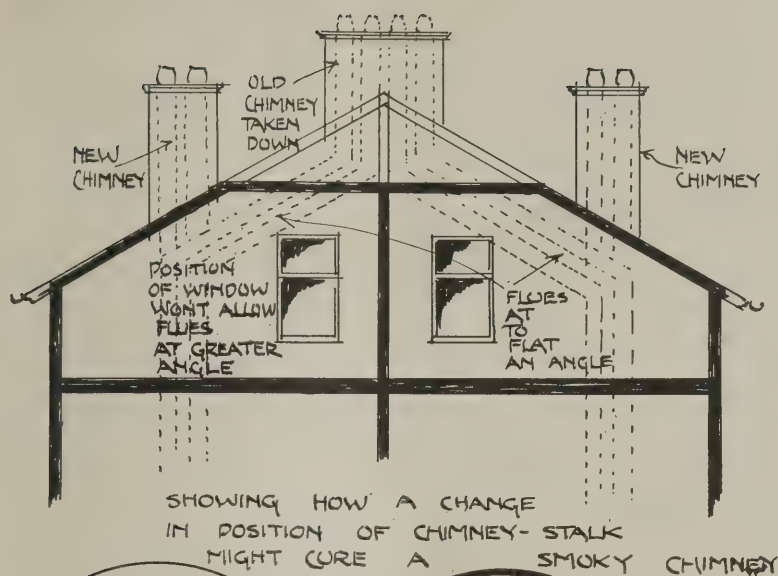
This is the reason why the gathering of the flue is of so much importance.

Of course air must come into the room by a separate channel by an open window or by the door but I have found chimneys sometimes continue to smoke after air channels have been formed,

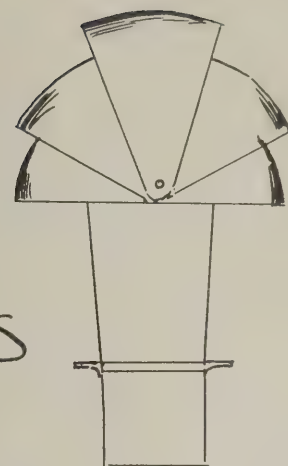
when a door is hastily shut or slammed, smoke and dust are drawn downward from the chimney.

The chimneys of houses situated on the side of a hill smoke in certain winds particularly when they blow down the slope on which the house stands. Here all the chimneys would be more or less affected by the blowdown current forming a partial vacuum in the apartments. Apertures opening towards the wind are the only effectual remedy in such cases, although many of the defects in existing chimneys may be defects of construction in form, size and workmanship.

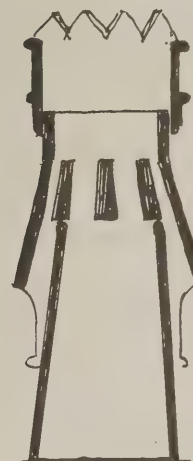
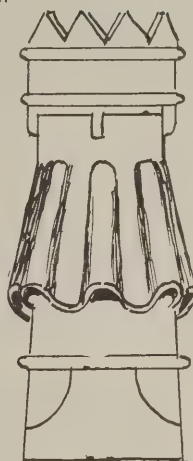
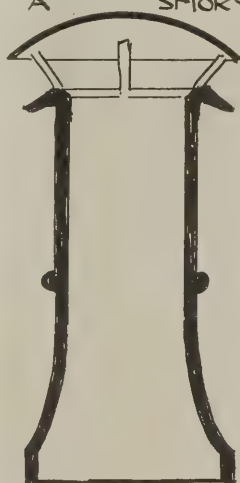
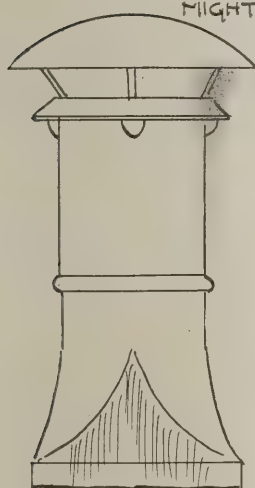
Defects of construction, if due to bad workmanship, may not be very serious. Perhaps a few bricks or some droppings of mortar have temporarily blocked the flue. These can generally be discovered and the obstructions be removed by



CURING SMOKY CHIMNEYS



SPECIAL CHIMNEY POT
IN SHEET-METAL



SPECIAL CHIMNEY-POTS MADE IN FIRE-CLAY



Example of terra cotta chimney caps on a home near Chicago. Caps like these can be executed in cut stone but are difficult to erect because of the weight. Molded work like this can also be executed in cement concrete.



Many architects design the brick chimneys of their American houses of severest simplicity. This illustrates one of these simple chimney tops finishing with merely a ring of brick and a cement cap.

cutting out the brickwork in front. This operation is seldom necessary but it is surprising how droppings accumulate in the building of a high stack and how difficult sometimes they are to remove.

If the design of the flue is wrong and it has been formed too near the horizontal at some part then there is only one satisfactory way to cure the defect

and that is by partly straightening the flue as shown in the line drawing.

The size of the flue is often a serious defect. In old houses many of the flues are too large.

As a rule such chimneys smoke when the fire is first lit but cease sometimes to smoke when the flue has become thoroughly warm.

A good plan is to burn a large newspaper high up in the fireplace just before the fire is lit.

Reduction of the size of a flue is not an easy matter. The lower part which is generally the worst, can be bricked up a good height, and perhaps the best plan to complete the reduction is to



One well-known American architect makes of the chimney a broad slab of masonry, like the main walls of the house. Here is an example of it--the chimney looks almost like a tower.

cut a hole in the flue at intervals and place some flue linings in the flue.

Chimney Caps

In mountainous districts it is a usual plan to cover the top of the flue on the chimney stack with a flat stone and make the smoke opening on the side of the stack.

The important feature of this arrangement is that a direct blow down is impossible and my experience is that this has been the guiding feature in design-

ing special chimney cowl for smoky fires.

In Britain special chimney pots of many forms are applied to the smoke stacks, all of them being more or less corrections of errors in the formation of the flue and stack.

These pots are often useful in diminishing the size of the opening at the top and preventing the entrance of cold air into the flue, but this reduction is best done at the throat of the fireplace.

Where strong winds prevail, a turn cap

or cowl with its opening turning from the wind is often useful.

Some of the most successful chimney pots are formed with inclined planes, which, deflecting the wind at the orifice assist the rise and escape of the smoke.

The variety of these contrivances are numerous but to my mind the common cottage cap, formed by a piece of stone or metal placed inclined to the wind, closing up the top and windward side and leaving the other side open is the best.

Concrete Foundations for Small Houses

CONCRETE has almost entirely displaced stone or brick in the construction of foundation walls. Among the reasons for this is the fact that the major portion of the aggregate (sand and small stones) is locally available, and this reduces cost, and the cement is the only material that has to be shipped in. Another thing that cuts down expense is that the labor required for mixing and placing concrete may be largely that of unskilled men; one expert concrete man

parts stone is not recommended. A 1:2:4 mix is stronger and denser, and insures a drier wall. A fairly wet mix is better than a dry one as it requires very little tamping to make it fill the forms. Too much tamping weakens concrete. It should be placed in the forms in layers not more than 12 inches thick, and the scum that forms on the top should be removed before the next layer is placed. This scum is called "laitance," and if not cleaned off it often causes a joint through which water will penetrate. The top of a partly built wall should be roughened with a pick, etc., and washed off with a hose before fresh concrete is placed on it.

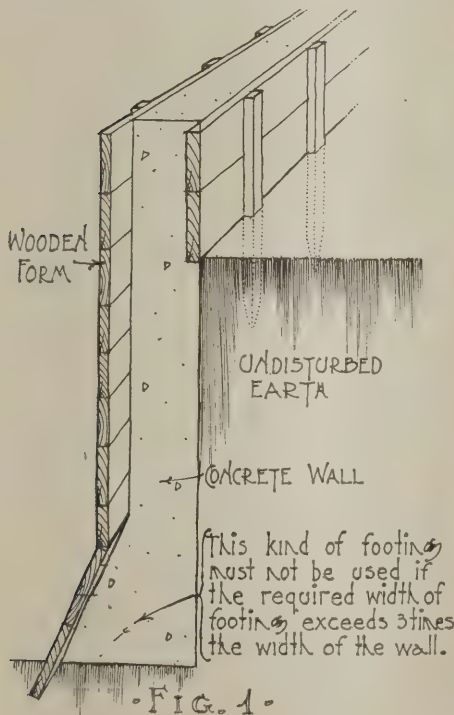
For cheap work the excavation is made the same size as the basement, and up to the grade line the earth bank makes one side of the forms; see Fig. 1. But if the foundation walls are to be watertight, the excavation should be made 8 to 12 inches larger, all around, than the walls require, in order to allow them to be plastered with cement plaster on the outside face, see Fig. 2. Also, this space between the wall and the earth bank can be filled with gravel, etc., and if a tile drain is placed at the footing level only a very small amount of water will reach the wall. This latter method of course requires forms on both sides of the wall, but this is a poor place to skimp work, as the strength and success of the whole house are largely dependent on the materials and workmanship that are put into the foundations. A damp basement will damage a builder's reputation quicker than any other one thing.

In firm soil the footing trenches are usually dug the same width as the footing, and the concrete is poured into this natural form. This trench should be somewhat wet before the concrete is placed, otherwise the earth will suck the water out of the concrete and this floor of water will carry a large amount of cement with it, thereby reducing the strength of the footing.

It is not sufficient to merely carry

footings to a good supporting bed, they must also be below the frost line. The depth to which the ground freezes varies with the climate, and runs from 4 feet 6 inches in the extreme northern states to practically zero in the South.

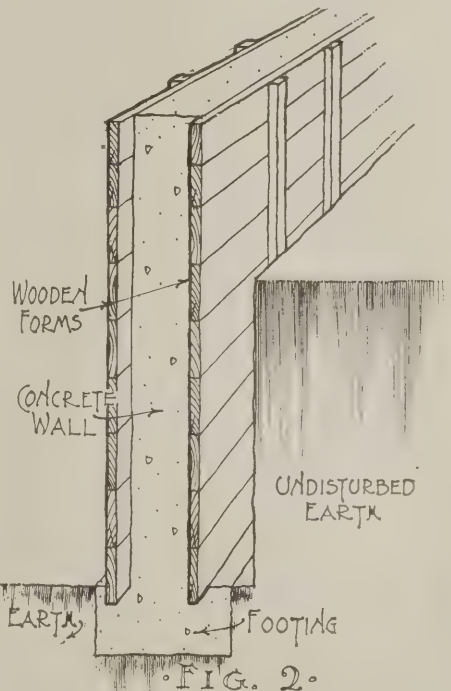
Footings for frame buildings should project at least 4½ inches beyond the



can supervise a large number of men who know nothing about concrete.

Although forms cost money, the lumber does not have to be first class stuff, and a large part of it can be used over and over. The main cost is for labor; and here again as in the concrete work, unskilled men can do the form work if they have good supervision.

The proper mix varies with the character of the materials, etc., but for foundations for buildings, a mix leaner than 1 part cement, 2½ parts sand, and 5



foundation walls on both sides, and should be not less than 10 inches thick. For houses with masonry walls they should project at least 8 inches on each side of the foundation wall, and should be not less than 12 inches thick. The dimensions given are for buildings in which the walls are not higher than 25 feet above grade and for good soil of average bearing strength. Loose or very wet soil requires wider footings. Loose soil may sometimes be strengthened by puddling and tamping.

Outside basement walls for brick buildings should be not less than 12 inches thick. For frame buildings they should be 12 inches thick up to the grade line, and above grade they may

be reduced to 8 inches. Eight inch walls are often used throughout, and insofar as crushing strength is concerned

they may be sufficient, but they are not stable. The pressure of 5 or 6 feet of earth against a wall is considerable and

it requires a heavy wall to safely resist this pressure. The thick wall is also more nearly watertight.

Preventing the Leaks

Approved Methods of Flashing and Trimming Windows and Exterior Doorways

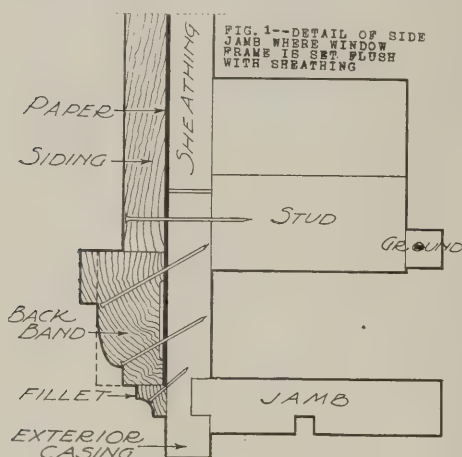
IN ALL weather-excluding and durable construction—the proper application of the exterior finish of windows and doorways depends upon the position of the window or door frame to the outside sheathing. The exterior casing, indicated in Figs. 1, 2, 3 and 4, is here considered as part of the window or

By Ernest Irving Freese

in Fig. 1. The back-band should then be tightly nailed in place over the paper and the latter then neatly trimmed off with a sharp knife flush with the inner edge of the back-band. The fillet, or "spider moulding", is then applied, set in white lead, at the juncture of back-band and casing, so as to protect the

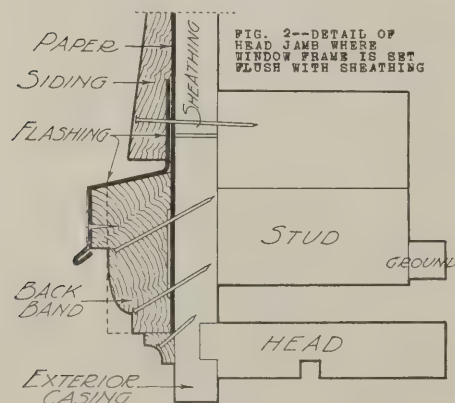
their overlapping ends, and yet not long enough to project below the course of shingles to which they belong. They should be thoroughly tacked to the edge of the back-band, but the part resting against the shingles should be held only by the nails that hold the shingles in place.

In the detailing of door frames, it

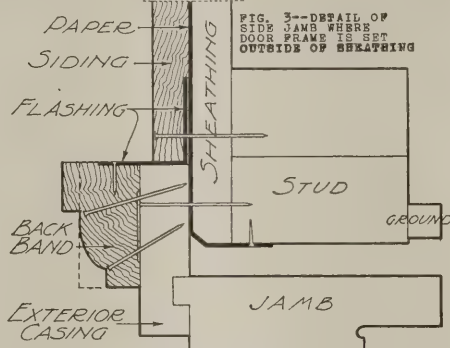


door frame, while the moulded back-band becomes the trim or "finish" of the opening, as is indicated in the drawings. It will be seen that the window or door frame, as the case may be, might be set either flush with the sheathing as shown in Figs. 1 and 2, or outside of the sheathing as shown in Figs. 3 and 4.

Where the exterior casing is set flush

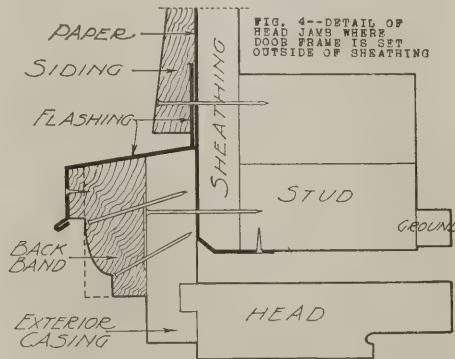


with the face of the sheathing—which should always be the case wherever possible—no side flashings are necessary, provided a tough, strong, durable and watertight sheathing paper is used, and provided further that the paper is extended, unbroken, onto the exterior casing so as to cover the joint between the latter and the sheathing, as is shown



end of the paper against the absorption of moisture and consequent rotting. It is to be especially noted that the back-band is "back out" so as to draw into tight contact with the paper and sheathing when nailed in place.

This construction will make a durable job, especially if the siding is of clap-



boards or some other form of horizontal boarding. In case the walls are shingled, however, additional durability and weathertightness will be obtained if "shingled in" side flashings of metal are used in addition, as is illustrated in Fig. 5. These side flashings for shingles are pieces of lead, zinc, tin or galvanized iron, 3-in. wide, bent at a right angle to fit the angle between the back-band and sheathing, and of sufficient length to cover each other at least an inch at

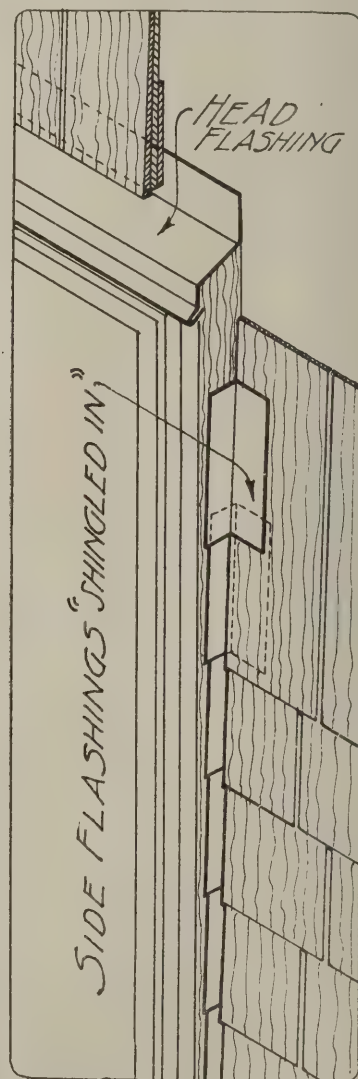
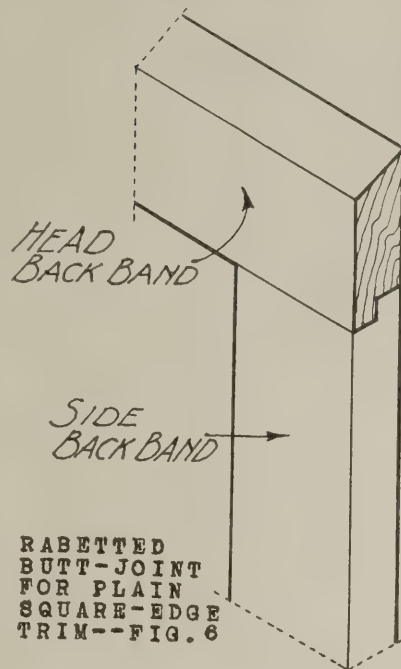


FIG. 5--SIDE FLASHING FOR SHINGLES AND HEAD FLASHING FOR ALL TYPES OF SIDING

sometimes becomes necessary, especially in a 2x4-in. stud wall, to place the exterior casing on the outside of the sheathing so as to give sufficient clearance for the knobs of the entrance door

and screen door. In this particular case, the exterior casing of the door frame also becomes the hanging stile of the screen door.

Fig. 3 indicates the proper method of flashing and trimming the sides of an opening where, as in the case just cited, it is necessary to place the exterior casing outside of the sheathing. Here, the sheathing paper must be applied around the opening before the frame is set so that the outside casing can be applied over the paper as shown. In this case, metal side flashings are absolutely essential to the exclusion of water that otherwise would not be barred from working its way in behind the window frame. If the siding is of horizontal boarding, the metal flashing should be of one piece from sill to head, but where shingles are used as a wall covering, the flashings should be of small pieces and "shingled in" as has already been instanced, and as shown in Fig. 5. The flashing metal should be of light weight, and particular care must be exercised to see that it is thoroughly and tightly tacked against the adjacent edge of the back-band. It is even advisable to plow a very slight rebate in the edge of the back-band, into which the flashing fits, so as to eliminate the possibility of



terior casing is set flush with the sheathing, and the latter corresponding to the jamb detail given in Fig. 3, in which the exterior casing is placed outside the sheathing. In both cases, the top of the flashed members should be given a pitch of about $\frac{1}{4}$ -in., and the flashing bent to the form shown. The

that runs down the face of the siding, thus breaking up the force of capillary attraction and preventing the lodgement of moisture at this point. Fig. 5, already referred to in connection with "shingled in" side flashings, also shows, the method of applying the head flashing for any type of window or door frame as well as for any type of wall covering.

Where a plain, square-edged finish, or back-band, is used for the exterior trim (as is indicated by the dotted lines in Figs. 1, 2, 3, and 4), then the side back-band should form a rabbetted butt joint with the head back-band, as is shown in Fig. 6. Subsequent crosswise shrinkage of the overhead piece will then not result in an open and uncovered joint at this point.

Where a moulded back-band is employed, the side and head mouldings should be "coped" together at the angles instead of being merely mitred. The finished appearance is identical with either form of joint. But a mitred joint is sure to "open up" because of the inevitable shrinkage or swelling of the wood.

In Fig. 7 is shown, graphically, the effects of shrinkage and swelling upon a mitred joint. In either case, the joint "opens up," for no mechanical de-

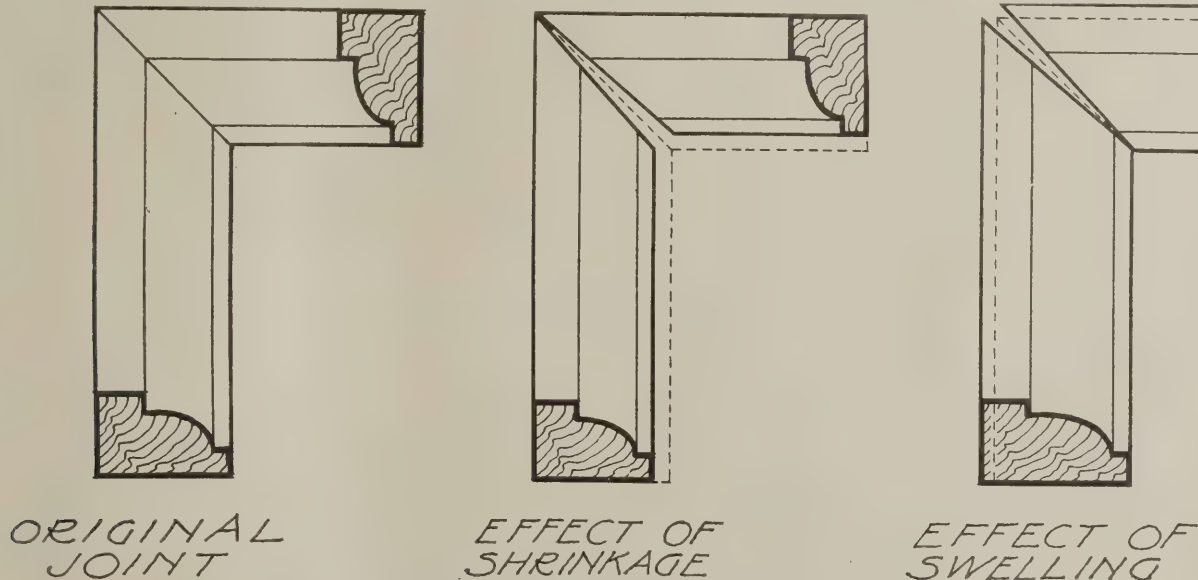


FIG. 7--EFFECTS OF CONTRACTION AND EXPANSION UPON MITERED JOINTS.

moisture penetrating underneath the flashing.

Invariably, all windows and doors should be flashed overhead unless, of course, a projecting and protecting hood, belt course or cornice renders such precaution uncalled for.

The proper application of overhead flashing is illustrated in Figs. 2 and 4, the former corresponding to the jamb detail shown in Fig. 1, in which the ex-

terior casing is set flush with the sheathing, and the latter corresponding to the jamb detail given in Fig. 3, in which the exterior casing is placed outside the sheathing. In both cases, the top of the flashed members should be given a pitch of about $\frac{1}{4}$ -in., and the flashing bent to the form shown. The lower edge of the head flashing should be bent outward at about a 45 degree angle and then back on itself so as to form a rigid drip-edge as shown. It should be tacked only to the face of the back-band, its upper part being held by the lower edge of the siding. Note, also, that the lower edge of the siding or shingles is kept about $\frac{3}{8}$ -in. above the top of the overhead flashing. This is done to give a free drip to the water

vice can prevent timber from responding to the forces of contraction and expansion. To say the least, these results are unsightly. But they are more than unsightly—they are a menace to the durability of the timber construction. Through these opened joints, moisture will work its way into the end wood of the mouldings. Furthermore, it will eventually penetrate to the back of the latter, and so underneath the flashing

and into the interior of the wall. On the other hand, in a coped joint, the end of the horizontal member is cut, or "coped" to fit the exact contour of the vertical moulding; therefore the joint does not extend straight through to the back of the members thus joined, and any moisture that may possibly work its way into the joint will, by the force of gravity, naturally tend to flow downward and out onto the exterior face of the vertical moulding. Again, any cross-wise shrinkage or expansion of the coped member will not open up the joint, while if the vertical member shrinks or swells, the result will not be apparent, for the joint will always remain "covered."

Fig. 8 illustrates the form of joint above referred to. Only the simplest forms can be successfully coped in exterior work.

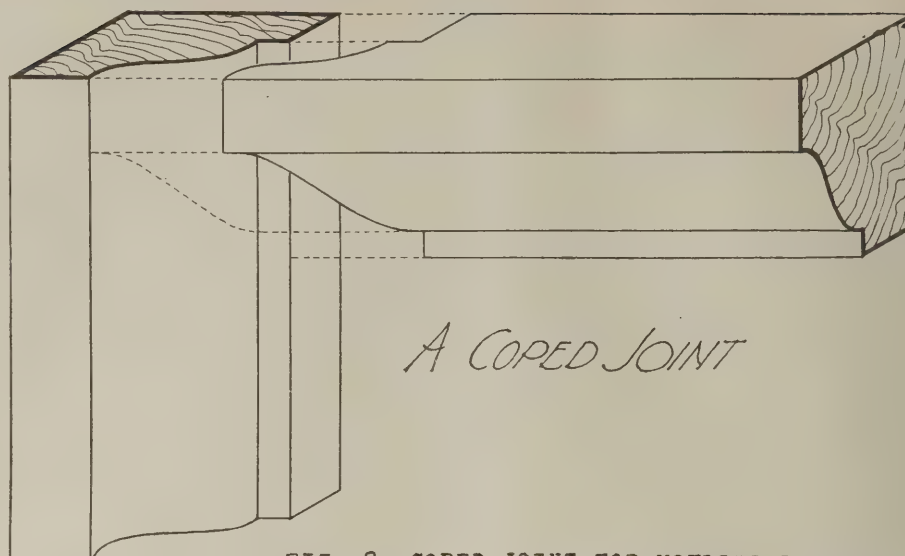


FIG. 8--COPED JOINT FOR MOULDED FINISH

Gambrel Roof Barns

THE OLD timber frame barns are not built these days for many reasons. One is there is no good timber, another, no one wants them, and no carpenter wants to build them.

The more the modern plank, or balloon frame becomes known the more the farmers want them and most of them want gambrel roofs on their barns.

This kind of roof gives more room for the amount of timber used, and the free, unobstructed, mow space is a desirable feature. Such a barn if well designed and well proportioned is much better looking than those of olden times.

There are several styles of plank trusses but all made on the same principle. They have a long brace from the purlin or the gambrel down to the post at the mow floor, and a principal rafter, from which a strut runs up to the purlin. In some, the long brace runs to the middle of the principal rafter. This is all right if the brace is not too far from vertical.

There is a tendency for the roof to spread at the eaves. This is prevented by the long brace which brings the pressure lower down, where the ties across the floor hold the sides together; there is a tie from the post just below the plate to the brace, which also helps to hold the eaves.

By using principal rafters at intervals a gambrel roof with purlins may be put on an old style timber frame without any supporting posts in the now. Simply run short posts or struts up from the rafter to the purlins.

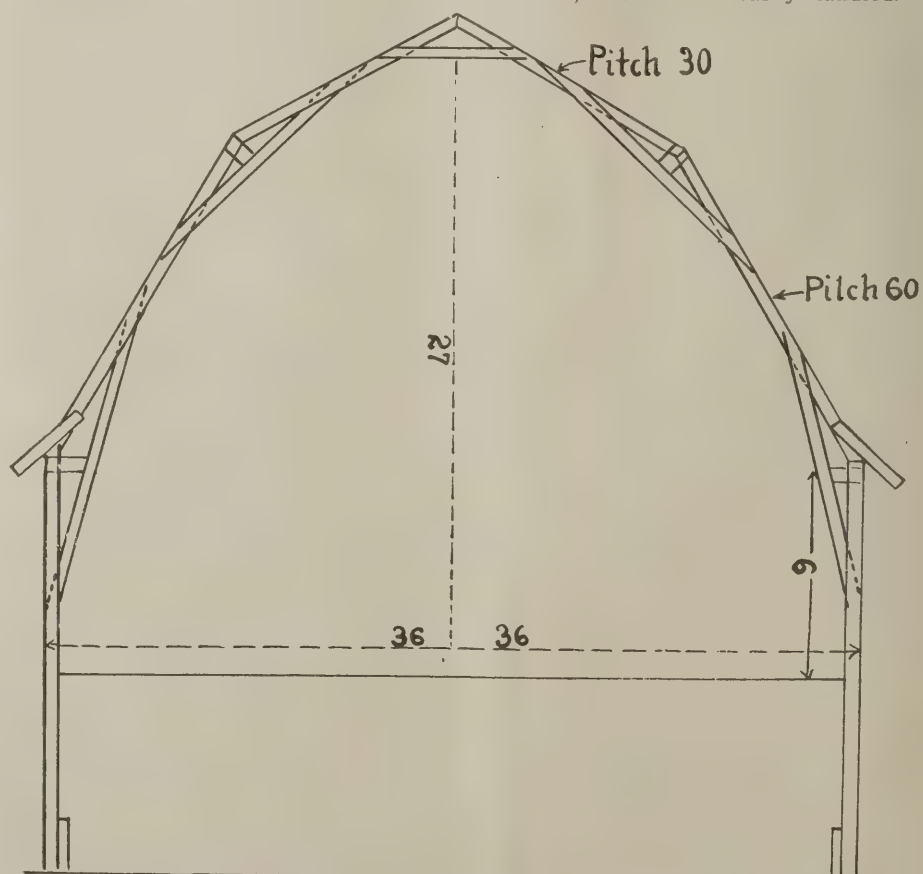
Designs of barn trusses are all very much alike, except that in some the principal rafter starts on the plate,

By John Upton

while in others it starts just below the plate and the braces may run up to the gambrel or to the principal rafter. In some the brace is set in a little from the side, at the foot.

The braced rafter method of con-

struction does not use these heavy trusses. Studs and rafters of 2x6 are spaced two feet apart and each set forms a truss or arch. Although these are two feet apart, they do not take much timber for a given length as do the heavy trusses, set fourteen to sixteen feet. The material being smaller and in shorter lengths, will cost less per thousand, and is more easily handled.



Braced Rafter Gambrel Roof

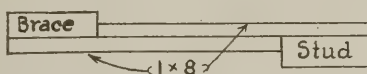
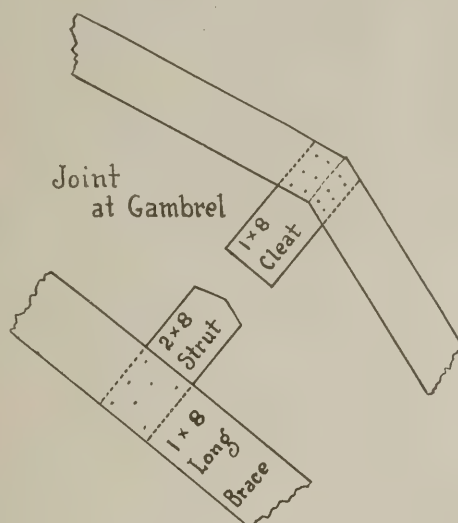
There are two common ways of figuring gambrel roofs to get the pitch and length of the rafters. One is to make the rise of the lower part twice the run and reverse these figures for the upper part. To get this take one-sixth the width for the run of the lower rafter, and twice this, or one-third the width, for the rise. In a barn 36 feet wide, this would be a 6 run, 12 rise, and 12 run, 6 rise. This makes the gambrel as high as the peak of a one-third pitch roof.

Of course the old time timber frame has the purlin posts set in one-fourth the width and made longer so that the lower rafters will rise more generally eighteen inches to the foot of run, and a third pitch roof for the top part. This does not get the lower part steep enough and the mow space narrows up too fast and there is no difference in the two parts in the pitch to look well. Another way is to set the lower rafters at an angle of 60 degrees and the upper ones at 30 degrees. If the two sections are equal, this would put the peak up the same as a half pitch roof, but as the lower one is longer the peak will be higher. A barn 30 feet wide will take rafters 12 ft. and 10 ft. A barn 32 feet wide takes 14 and 10. A barn 36 ft. takes 16 and 12.

This brings the peak a little higher than the half width above the plates and makes a well proportioned and good looking roof, as well as giving a large

collar beam four foot long, some short boards for ties or cleats and two long 2x6 braces to be put from the middle of the lower rafters to the studs at the mow floor after the arch is raised.

The run of the lower rafter is one-



half its length, the rise of the upper one is one-half its length.

You can build these arches on the mow floor which may be laid as soon as the studs are set up, the sides boarded and the joists in place.

For a 36 foot barn strike a line across

patterns and use them to mark the rafters. There is no projection or tail. A piece is spiked on to make this, so when rafter cuts off at right angles to side of the barn or plumb line, use butt joints at gambrels.

Studs are 16 foot. Sill and plate doubled. Joists run across rest on four ply built up girders supported on posts.

Joists lap bye, are spiked together and to the studs at the sides, and make a tie to hold the sides from spreading. The plate at the ends is 2x10. Set up one end arch. Finish that end and then raise the others. As the last few are raised set them in from the end until all are up, then set out to place. Put on some roof boards as the arches are set up.

Notches for the 2x6 ribbon plate which support the outer end of the joists are one inch deep and cut out before studs are set up.

HANDY SIDING-HOOK

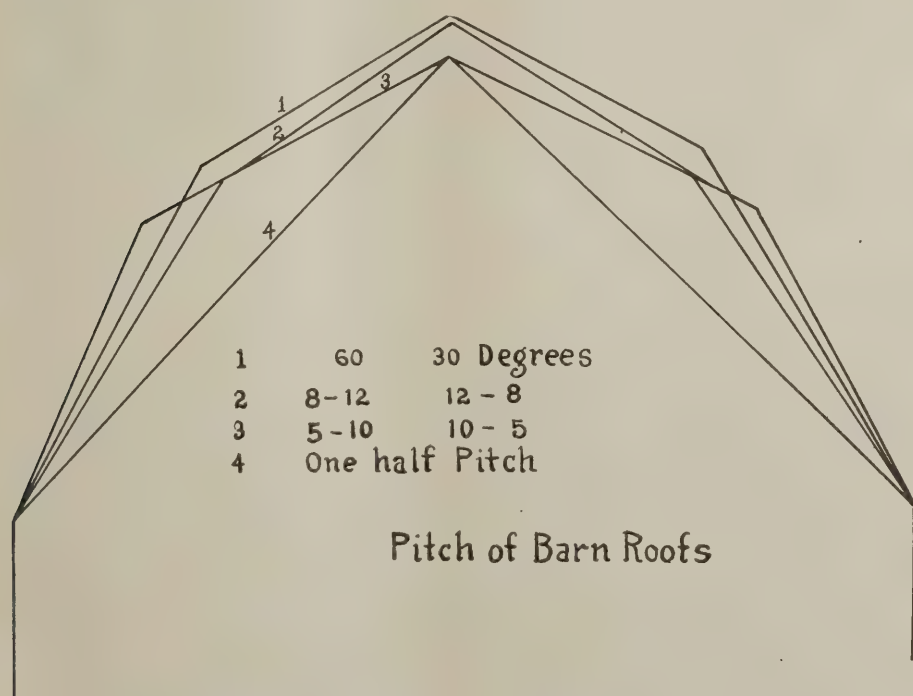
In October, 1918, NATIONAL BUILDER I notice a sketch from J. V. R., Omaha, Neb., of a siding-hook. I submit another style I have used for a number of years, which I think more convenient, as I have used both. The clothes-pin style is as convenient against casing or corner board and can be used also as a butt joint. I do not give any dimensions, as any workman can make it to suit the material used. If made of good hard wood it is a good tool to add to the kit.—Ira A. Wright, Highmore, S. D.



TERRAZZO

A correspondent writes, "We had a job calling for Terrazzo skirting. We did the job, all right, but no one knew what the word Terrazzo meant. Will you let us know or give us a definition of the word, or the meaning of it? I can't find it in the dictionary."

The Century dictionary says, "This is a trade name for a kind of concrete pavement, made of broken stone and hydraulic cement. It is an Italian word meaning terrace or balcony." An exchange says that a writer by the name of Sagredo, in referring to building construction in Venice, tells how Venetian pavement—today referred to as Terrazzo floors—was laid. In A. D. 900 the usual method was to lay down a floor of heavy planks, upon which a third layer of mortar and small pebbles was spread out and beaten down to a hard surface; upon this a second layer of cement mixed with pounded bricks was spread, and this was beaten with heavy wood beaters till it was perfectly hard and even.



Pitch of Barn Roofs

space for the storage of hay or other fodder.

The braced rafter arches will each take two 2x6 rafters of each length. Four 1x8 boards 12 foot long for the two braces at each gambrel, two short pieces 2x8s for struts at gambrel, a 2x6

from one end then strike lines eight foot in from the sides. (These figures being half the length of the rafters.) Where the lines cross will be the gambrels, the peak coming at the middle of the end.

With these points lay out a set of

Farm Houses in France

THE opportunities for a study of the architecture and building construction of France for the average American soldier are decidedly limited.

By far the greatest amount of our time has been spent in rural communities and in small villages (sometimes we were the population). The cities have been seen only while passing through, and usually from the door of a "side-door pullman," known here as an 8-40—eight horses or forty men.

However, there is interest in the typi-

By Sergeant Hugh MacLure

and a few sacks of grain and provisions. The sink is a hollowed stone slab, which empties into a lead pipe which in turn empties into a small cess-pool under the stable floor.

The back bed room is separated from the middle room by a wood partition with several sash.

Through this sash comes all of the

permits of the entrance of a loaded wagon. The little, low room overhead is boarded up and utilized as a kind of a stronghold for grain.

The hall is a convenient way to lead the horses out to the public fountain.

The stable is a right comfortable stable—for the animals. It has its advantages, too. In the cold winter, it



cal home of the Frenchman who lives in villages or on farms.

The first impression I had of these homes was anything but a good one. We were billeted in a small village after our journey from the coast.

The living rooms were occupied by the family or by officers, leaving a place for the soldiers in the driveway, or if you were lucky, in the hayloft. The animals quartered with us were within a few feet—too close for us to sleep well. Yet, by studying the sketches it can be seen that the Frenchman doesn't mind it.

Sketch No. 1 shows a home which is of the better class. The living room, where they live and cook and eat is farther from the stable than in most of the homes.

There is no stove. Only an open hearth of stone, and the cooking is done very much the same as Americans do their cooking while "camping out."

This little fire also furnishes the heat for the entire house. The temperature, as a result, is similar to that of a three-story flat with a small boiler and a pinochle-playing janitor.

The bed room, just back of the living room, contains, besides one bed, the sink

light which gets to the middle room. Not much light.

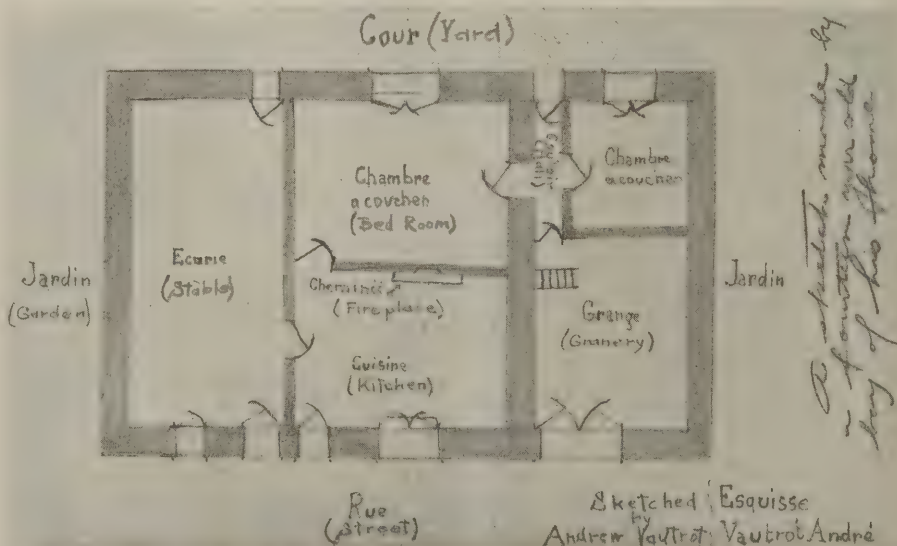
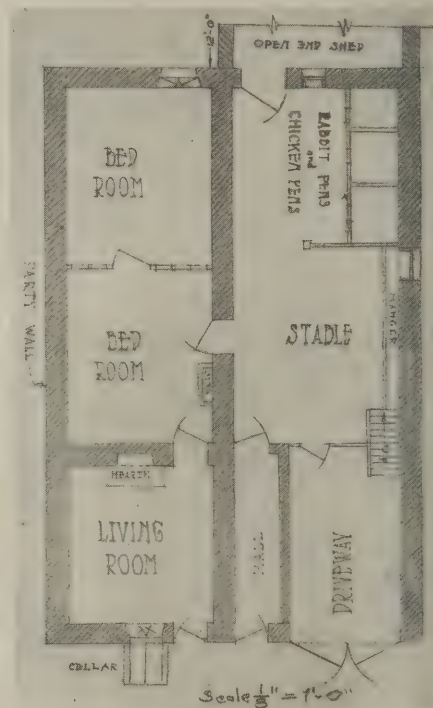
The back room is quite well finished. It is plastered, too, and has a rather large window.

In the driveway the wagon is kept. The double doors are about twelve feet high. The floor of the hayloft over the driveway is raised four or five feet. This

must be pretty nice to just step into the next room to milk the cows.

The rear of this room is taken up with rabbit pens and chicken roosts.

A later addition to the building is an open-end shed, used as a shelter for implements and the wheelbarrow.



A hayloft covers the entire area of the building excepting the space over the driveway.

Firewood, unthreshed grain, grain in sacks, and hay are stored in the hayloft.

The cellar is only as wide as the living room and extends as far back as the fire place. It holds the stock of potatoes, salad plants and wine.

The walls of the building are of rubble stone, plastered. The corners of the building, the portals and lintels of doors and windows, and door sills are of cut

stone. Purlins, beams, and rafters are rough-hewn timbers. Roofs are invariably tile.

The carpentry is good—what little there is of it. Sash and doors are well made. The floor is matched stuff.

In most cases the furniture consists of a wonderful old sideboard, a wardrobe or two, and excellently-designed and well-built bedsteads and chairs. A grandfather's clock is seen in many homes also.

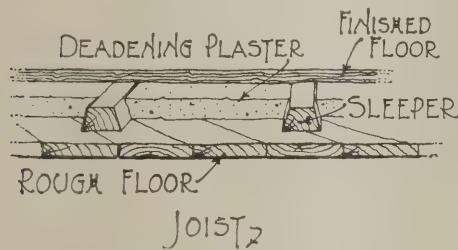
Sketch No. 2 was made by a little protege of mine. It represents his own

home. In it, the kitchen opens directly into the stable! The sink is placed under the window fronting on the street, and drains, through a stone trough, into the street.

It is my opinion that there are a great number of Americans now in France who have learned to have a better appreciation of the excellence of the average home in the States as compared with the average French home. This may have something to do with the homesickness epidemic.

Sound-Deadened Floors

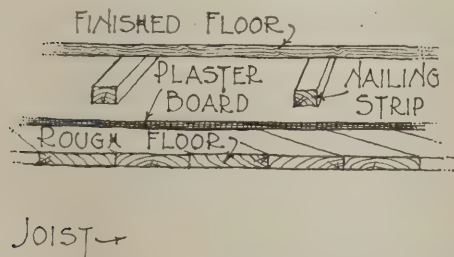
CARRYING sound through floors may be likened to the transmission of sound through a telephone instrument. The finished floor is the transmitter; the



- FIG. 1 -

joists, etc., are the receiver; and the nails are the connecting wires. If we interfere with the connection between receiver and transmitter, a phone is rendered useless. So, if we break the metal connection between the finished floor and the joists we will have done a great deal toward reducing the carrying of sound through floors.

Fig. 1 shows a method that is used to sound-deaden floors. It consists of spreading an inch and one-half of plaster or cinder concrete between the rough floor and the finished floor, with wooden sleepers spaced in it at 16-inch inter-

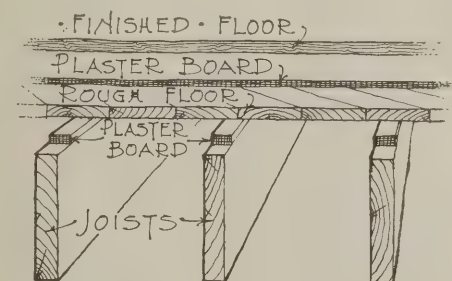


- FIG. 2 -

vals to afford a bearing for the finished floor. Its efficiency is doubtful and the weight on the floor construction is considerable.

The method shown in Fig. 2 is recom-

mended for its simplicity and if it is carefully done it will reduce the passage of sound to a marked extent. In this method the rough floor is laid in the usual manner; the entire surface is then covered with a layer of plaster board $\frac{3}{8}$ of an inch thick and composed of gypsum plaster and felt. The $1\frac{1}{2} \times 2$ inch nailing strips are laid on top of this surface at 16-inch centers and at right angles to the joists. Finally, the finished floor is laid in the usual manner and nailed to the nailing strips. Good judgment must be used in selecting nails so that they barely enter the plaster board and do not pass entirely through it. In this method the finished floor



- FIG. 3 -

may be said to "float" on the rough floor; their connection by nails is broken and an almost sound-proof floor is the result. An apparent disadvantage of this method is due to the fact that mice can run in the space between the rough floor and the finished floor. This disadvantage is more apparent than real, however, because in almost any system of joist construction mice may run in the space between the joists.

Fig. 3 illustrates a method that is also used. A strip of plaster board is inserted between the joists and the rough floor; the rough floor is covered with plaster board and the finished floor is nailed down in the usual manner, no attention being paid to the puncturing of plaster board by the nails. It is not recommended.

The method shown in Fig. 1 is often given value as a fire retardant. This is a somewhat fictitious value, because a fire from below would soon consume the rough floor which would allow the plaster filling to fall, leaving an unobstructed passage for the flames.

PHOTOS WHICH CONVEY DEFINITE INFORMATION

Construction photographs, if they are presented in good form, are the records which interest clients most. A photograph which does not tell its own story is of little value. This may be how the site looks before work is begun, how work is progressing, how good the workmanship is, why progress is delayed, extra work that had to be done, special features of structure or construction plant—or, perhaps, faulty work—but there should always be a story, says an exchange.

Progress photographs are of most importance. Two vantage or observation points should be carefully chosen before work begins. Always take the photographs from these points, as progress is thereby emphasized. Different days, not less than two a week, should be designated, and on these days, weather permitting, one photograph should be taken from each vantage point.

Detail photographs will depend upon the subjects which present themselves for record. Suggested subjects are: Placing and handling material; exceptional and unusual formwork or concrete work; unusual structural features; finish work of various kinds, night work, special equipment, and ornamental details.

In addition to progress and detail photographs, it is advisable to record work, conditions which hinder progress, faulty or defective work, and accidents. All photographs should be titled and dated. When the work is completed, those photographs which mean something, which show progress or excellent work, should be mounted in a small album. Then use the album.

A Sectional Job Office

MOST sectional job offices are put together with a more or less complicated and expensive system of hooks, clamps, etc. The sections of this one are merely nailed together. The nails are not driven clear up and are easy to pull out when the time comes to take the sections apart.

In Eight Sections

The office illustrated is in eight sections; two sections form the roof; two the floor; and four the sides. The



Sectional Job Office

benches, etc., are fixed to their respective walls. The general construction is clearly indicated by the drawings, and the photograph shows how it looks when put together.

Construction

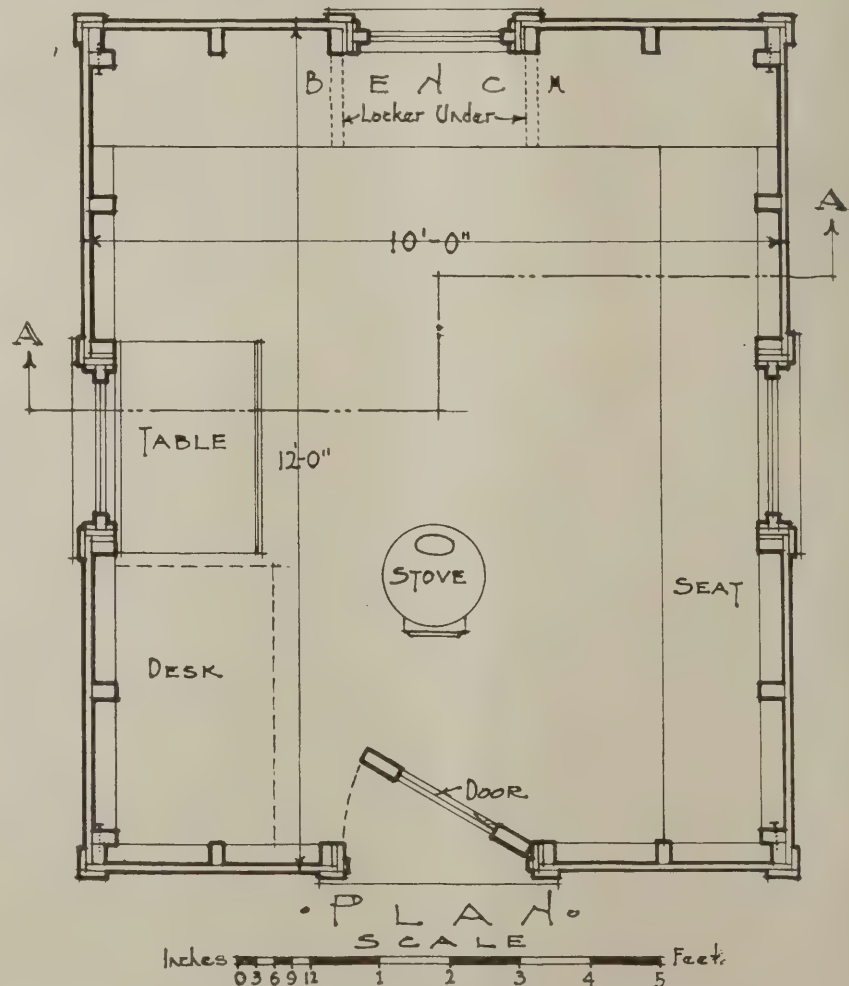
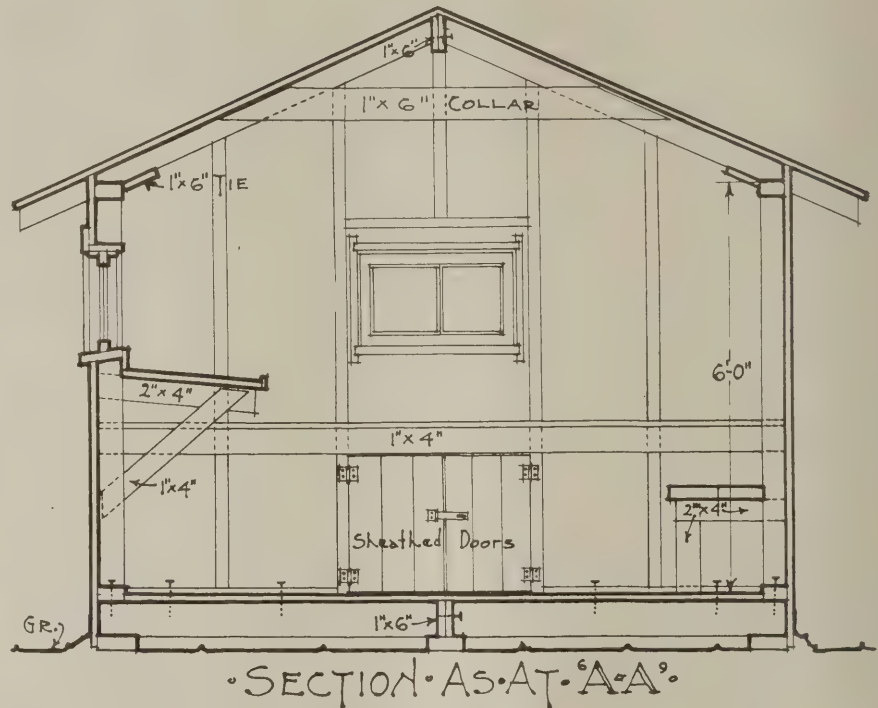
The framing is of two-by-fours placed two feet on centers. The walls and floor are of $\frac{7}{8}$ -inch shiplap. The roof is of asphalt shingles on $\frac{7}{8}$ -inch sheathing. The windows may be stationary or hinged at the top.

The table makes a handy place to unroll blueprints; the bench may be used as a place to sharpen tools; drawings, etc., may be put in the locker, out of the way. The seat will be appreciated by the men during the noon hour, and nails driven in the plate make a good place to hang coats.

When it comes time to move, the collar beams are knocked off; one floor board is removed; the nails securing the sections are pulled, and the office is left in convenient sections for removal.

Not a Tool Dump

A job office should be something more than a place in which to dump tools. It should be roomy enough to accommodate the men who eat lunch on the job, and in winter it should be heated. Anyone who has sharpened tools in the cold can best appreciate what a stove means under such circumstances, and a cup of hot coffee at noon often puts "pep" into a man who has been dilly dallying along on the job because he was stiff with cold.



An Outside-Icing Refrigerator

IN response to various questions asking how to build an outside-icing refrigerator, the following suggestions are offered. It should be understood at the outset that to make a home-made refrigerator that is a good ice-keeper and at the same time make a neat and sightly job of it is a difficult task, and the low cost of the factory-made article does not warrant the trouble.

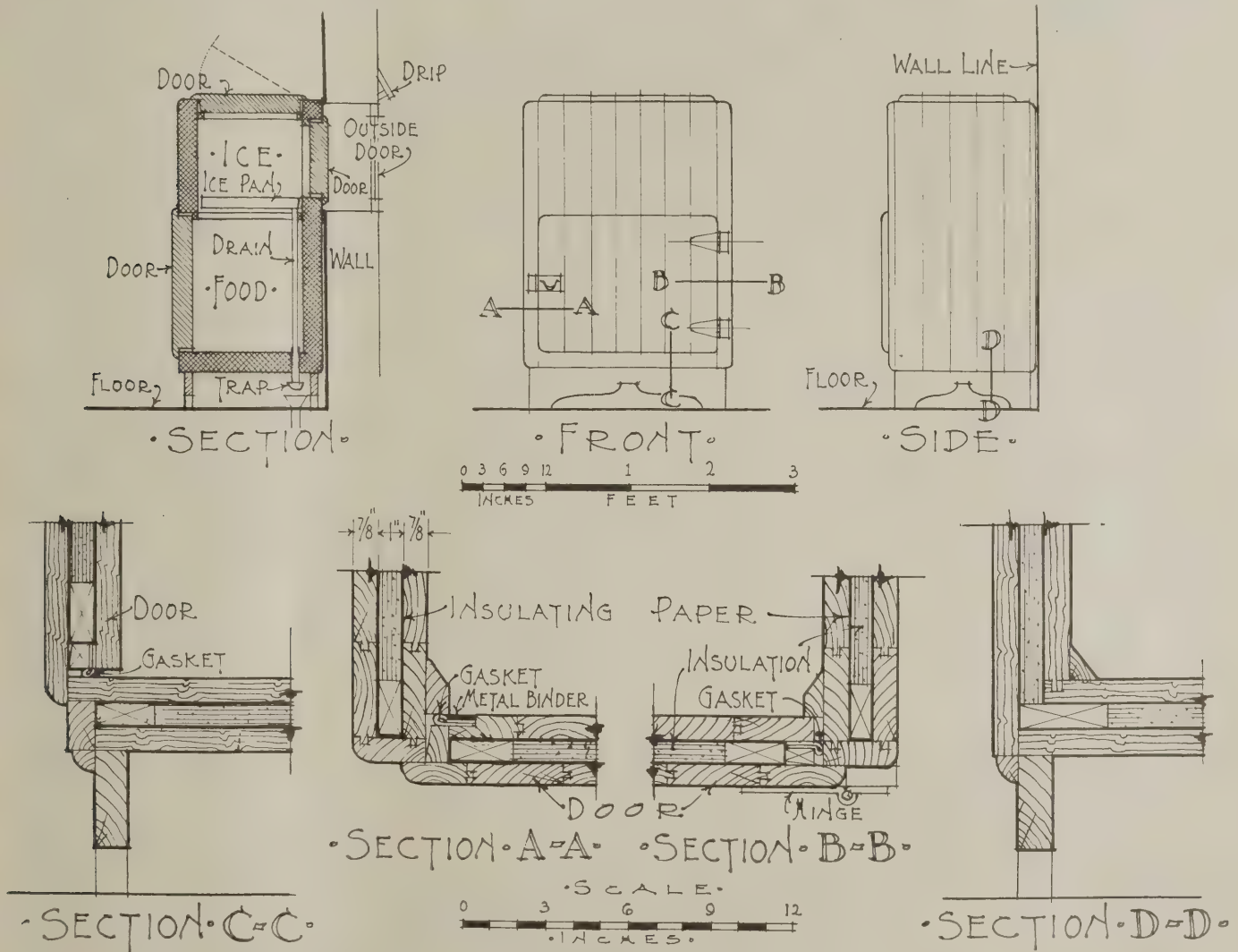
In view of the popularity of outside-icing refrigerators, they are now manu-

odorless white spruce or poplar. All sheathing should be tongue and groove with the joints set in white lead and oil. Metal lining is not recommended.

The insulation may be of tightly-packed mineral wool, cork or sawdust, with a layer of heavy insulating paper next to the wood sheathing. The mineral wool is by far the best, and for a box 3 feet 9 inches high, 1 foot 9 inches deep, and 2 feet 6 inches wide, about 30 pounds is required.

hold the door close to its seat. The hinges may be of the offset type or flat ones blocked out as indicated by section BB. The shelves should be of metal, and easily removable for cleaning.

There is no particular advantage in beveling the edge of the door nor the jamb. Such a joint leaks badly if the door is sprung or is carelessly made. Of course, the edge of the door opposite the hinges must be given a slight bevel for clearance.



factured in a variety of styles and to suit almost any condition. The popularity of this type of refrigerator is due to two features that appeal to women. First, the ice-man does not have to come into the house and leave a trail of dripping water across the floor; and second, the icing-door may be left open in cold weather, and the refrigerator will perform its duties without the aid of ice.

The exterior sheathing may be of wood to match the finish of the room. The interior woodwork should be of

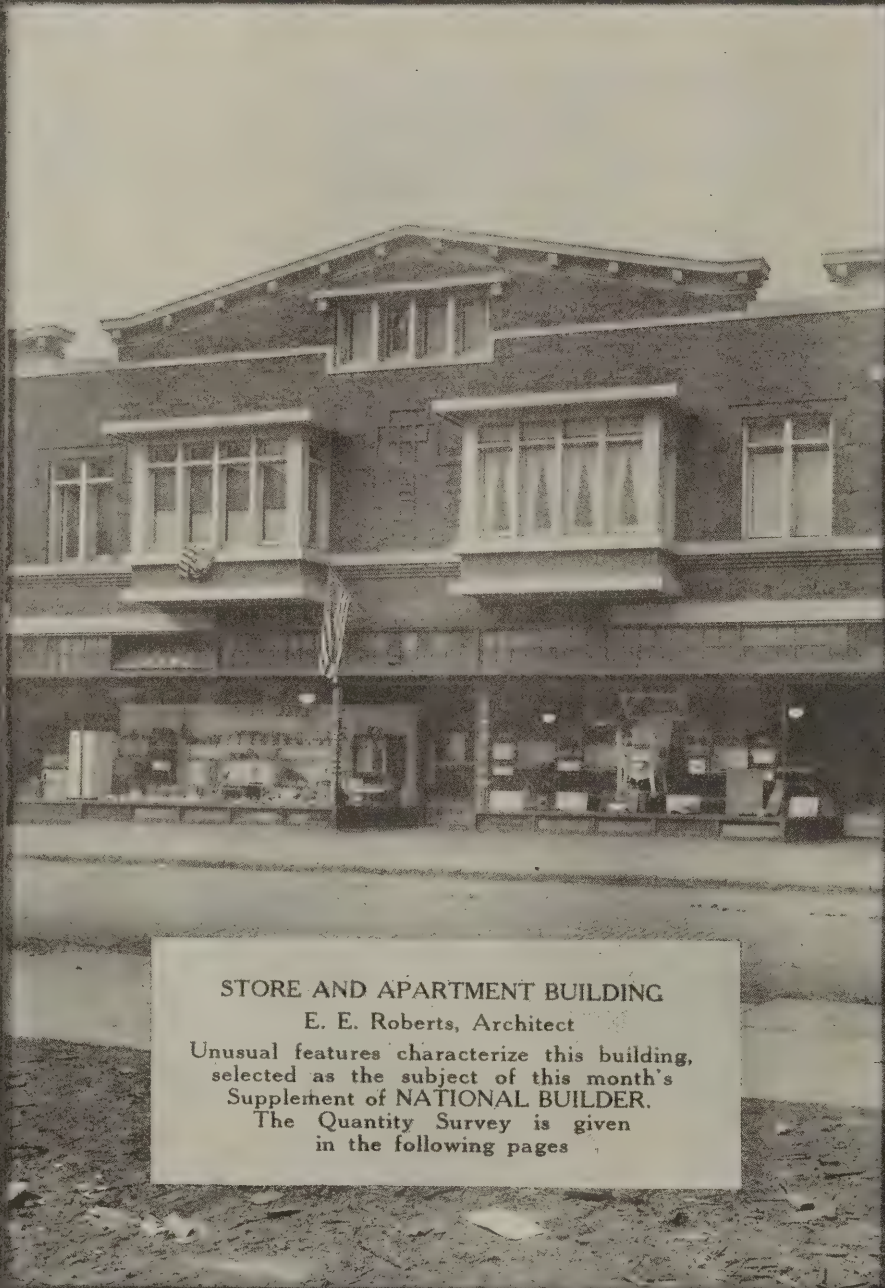
The gaskets should be of some pliable and durable material, such as strips of thin rubber belting, and should be removable for renewing.

Ideas as to the details of the ice-pan, drain, etc., may be obtained by examination of any good refrigerator. The principal thing to consider here is to arrange the ice-pan, drip pan, gutter, etc., so that they shall not entirely cut off the circulation of air between the food and the ice compartments.

The latch should be of a type that will

The type of refrigerator as planned should be varied to suit the size and conditions required.

Small coolers for meat-markets, stores, hotels, etc., are constructed according to the same general principles that govern household refrigerators. A 2 by 4 frame sheathed on both sides, with the insulation in the space between, makes a good wall. The doors often have glazed panels for display purposes. These are made with three or four thicknesses of glass with dead-air spaces between.



STORE AND APARTMENT BUILDING

E. E. Roberts, Architect

Unusual features characterize this building,
selected as the subject of this month's
Supplement of NATIONAL BUILDER.

The Quantity Survey is given
in the following pages

Store and Apartment Building

Supplement No. 464

THE policy of NATIONAL BUILDER is to serve all of its readers. That is the reason for the selection of the working drawings of a combination store and apartment building as the supplement for this issue.

Working Drawings

In presenting complete working drawings in the supplement, it is not the intention that they are to be actually built from, but that they are to be used as guides in solving similar problems that arise in *your* work. For instance, you may have occasion to use a steel beam to carry a certain kind of construction. If you examine a working drawing for a similar building it is possible that you will find a beam of about the same span, that carries just such a load, and it will not be necessary for you to figure out the size to use.

Arrangement

The building chosen for the April supplement was designed by E. E. Roberts, architect, of Chicago and Oak Park, Illinois. It is so fully illustrated that no description of its construction and arrangement is required, but it is not out of place to call special attention to the unique arrangement of the second floor. The open air court on this floor is a practical solution that may be applied to almost any similar problem. By its use each apartment is assured the maximum amount of light and air and the

entrances opening on this court are given a degree of privacy that is seldom possible in an apartment group. Trellises and flower boxes would give this court a "homey" appearance and it might be desirable to have high windows opening from the kitchens onto the court.

Stores with apartments above are growing in numbers all of the time and there is scarcely a community in this country in which buildings of this kind would not prove to be a desirable investment. In even the very small towns there are people who would quickly avail themselves of an opportunity to live in an up-to-date apartment of this character. In fact, it is now being recognized that such apartments are generally easier to rent than are the offices which are often placed over small store buildings.

Planning

As an example of how plans of this character may be changed to suit other conditions; lay a piece of tracing paper over the second floor plan and see how many arrangements you can work out. Try making the apartments into two-room suites, three-room suites and so on. Then change the character of the building by planning offices along the street front with apartments in the rear; make another arrangement turning all of the rooms into offices. Also try laying out a plan for a narrower building having rooms along the front and rear and

down one side, with an open court along the other side. The open air court should be used in all of these layouts, but its location may be varied. The stair from the street may also be varied. Different schemes for dividing up the first floor into smaller stores should also be tried out.

In any planning always keep the structural and the practical requirements clearly in mind. Don't make a complicated problem out of a simple one.

The Quantity Survey

In the two previous issues we have shown the forms and the manner of taking off the quantities of materials used in buildings. They are omitted from this issue as they would be of less general interest than the subjects that replace them, but will be furnished for transcription to any of our readers who request the loan of them for guidance in constructing a similar building to that shown in the supplement.

The problems of surveying quantities and determining costs in advance are not easy, and no ready-made process has been found that can be safely applied. Comparisons and experience ripen the judgment in such matters, and in future issues variations in different kinds of construction will be discussed, the exposition of the quantity survey in the past two issues having sufficiently served its purpose.

Unfinished Churches

WITHIN a radius of three blocks in Cleveland, Ohio, are three uncompleted churches, the construction of which was stopped by the government war orders. Temporary roofs have been put on the first floor joists, and services are held in the basement. Now that realization of the new conditions under which construction must be carried on is making way, the activities of these churches may no longer be crippled by cramped quarters, and the dispensing of charity be largely replaced by the distribution of work.

Money spent on church building now will have a double value in carrying out its mission to relieve, support and comfort and awaken higher aspirations and bring into activity the latent wealth that is lying idle in the form of men and material.



Enlarging a City

WATERTOWN, N. Y., had more workers than it could house in the early stages of the war. It is the site of the New York Air Brake Company, and most of the 26,000 to 27,000 inhabitants are directly or indirectly dependent on this concern for employment.

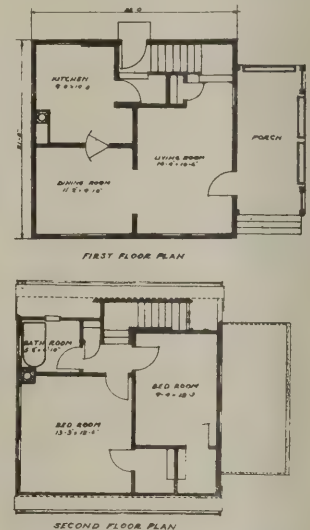
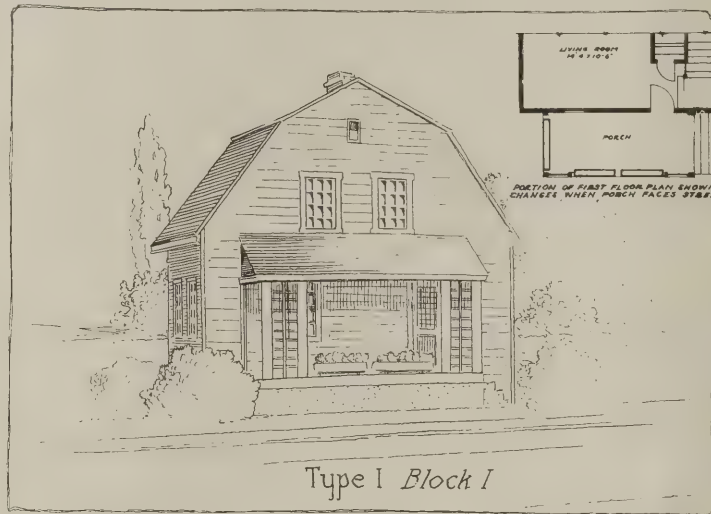
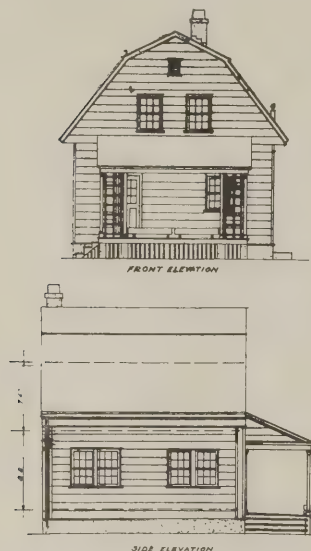
The problem of housing changed from a local interest to a national one after the United States entered the war and

By Edward H. Causey

States Housing Corporation, sent a commission to study the situation and to meet the estimated demand for 500 additional houses.

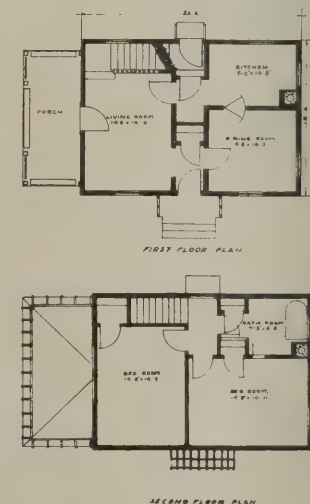
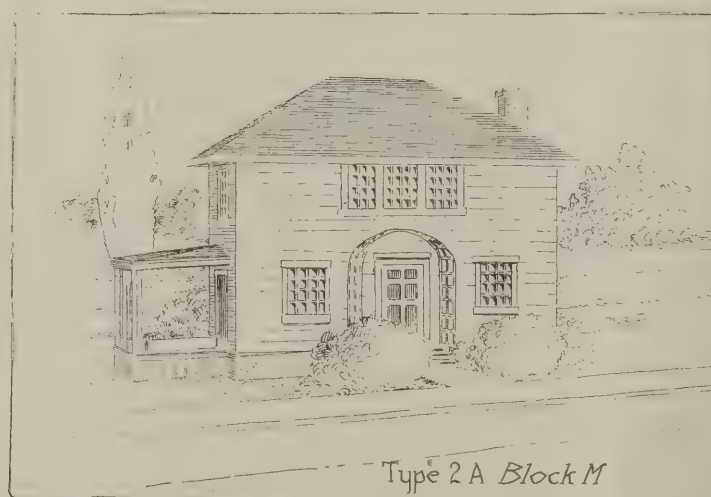
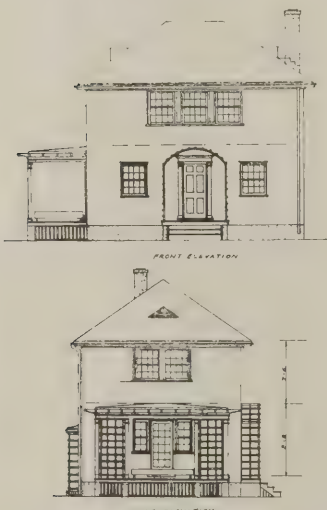
The site chosen for the buildings had two-thirds of the utilities and street improvements already in place.

While the first study of local conditions indicated that the two-story detached house of from six to eight rooms on a fifty by one hundred foot lot—as a minimum—was the rule, for which the workmen were accustomed to paying from \$3.50 to \$5 a week rent, still, owing to the extreme pressure of economic conditions it became evident that it would not be possible to maintain these



Type 1, Block I—Variety in grouping is obtained by placing some houses of this type so that the porches face the street while the others have the porches at the side. Note the stair

in the living room; this can be made an attractive feature. The niche in the kitchen wall beside the swinging door is for a kitchen cupboard.



Type 2—This house is almost identical with Type 1, the principal difference being that this house has a hall on the first floor which forms a small vestibule and also gives an entrance

from kitchen to living room. This shows how easily plans of the same kind may be altered to give variety or to suit different conditions.

the Ordnance Department had placed orders with the Air Brake Company for munitions.

This meant that a town of 26,000 was required to take care of an additional eight or ten thousand workers almost over night.

Otto M. Eidlitz, director of the United

It was within half a mile of the center of the city and was provided with a public school, two churches and a few stores, thus allowing all of the available funds to be applied toward the construction of the houses.

Davis, McGrath & Kiessling of New York City, were the architects.

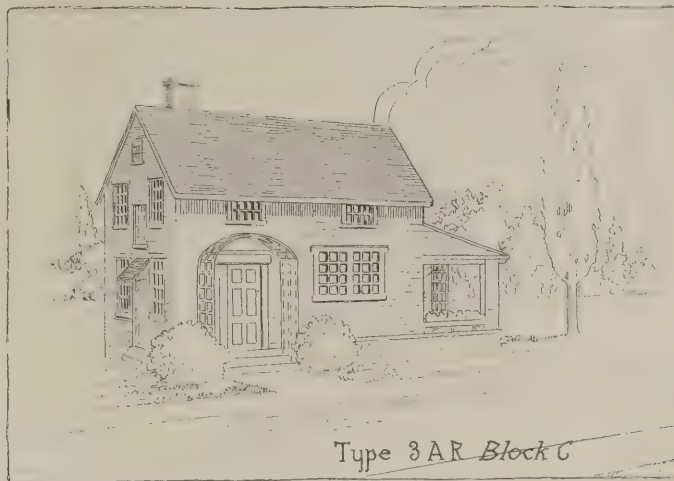
standards entirely. The sizes of the houses were therefore limited to five and six rooms only and about 25 per cent. of the houses were made of the semi-detached type. The detached houses have lots ranging from forty-five to fifty feet in width, while the semi-detached houses have a forty-foot frontage for each half.



FRONT ELEVATION

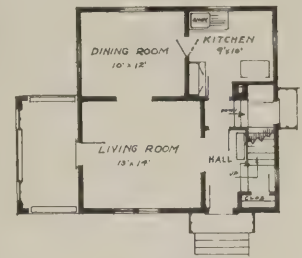


SIDE ELEVATION

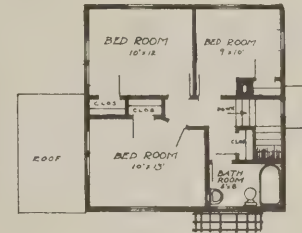


Type 3 AR Block C

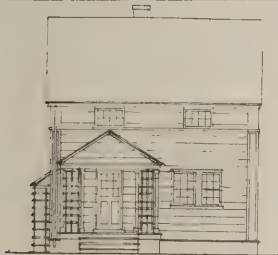
Type 3—The arrangement of the stair hall is worthy of study. It is very compact and the circulation is good. The coat closet at the foot of the stair is well placed. The niche beside the grade line entrance door at the side of the house is for a refrigerator.



FIRST FLOOR PLAN



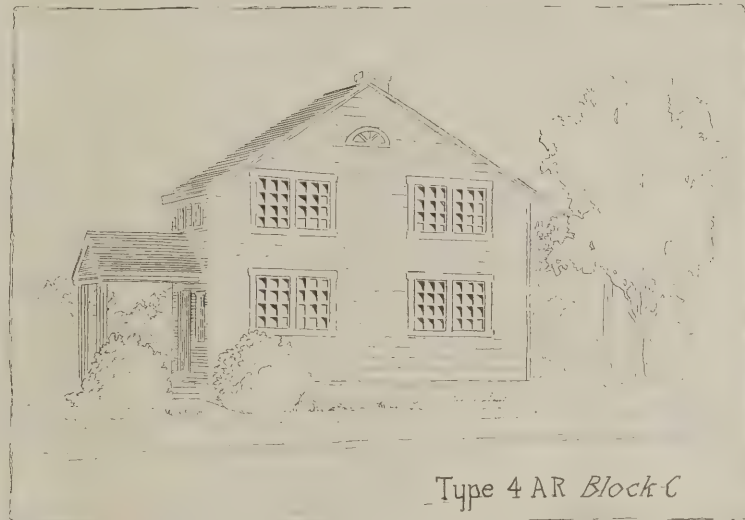
SECOND FLOOR PLAN



FRONT ELEVATION

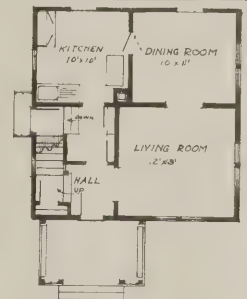


SIDE ELEVATION

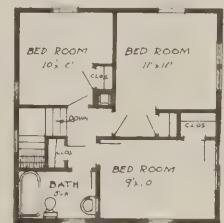


Type 4 AR Block C

Type 4—This type is similar to Type 3, about the only difference being that this one has no living room porch. The stair hall is made larger, the rear portion forming a sort of pantry. This plan is probably better than that of Type 3.



FIRST FLOOR PLAN



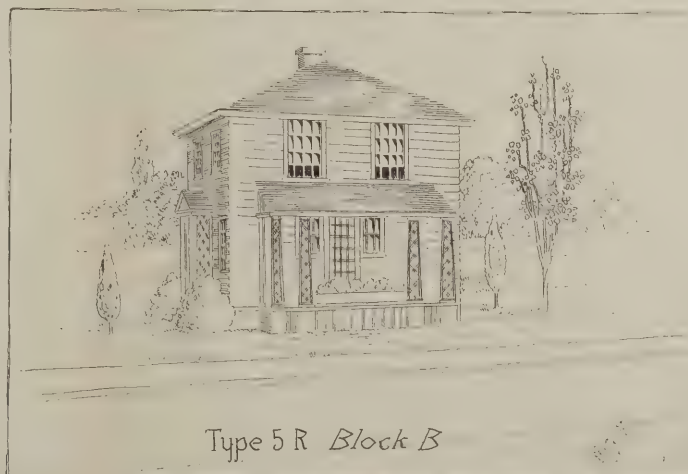
SECOND FLOOR PLAN



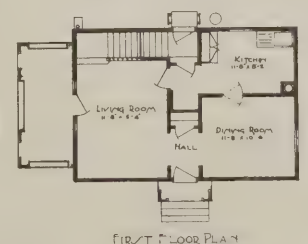
SIDE ELEVATION



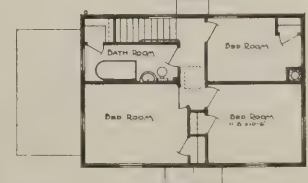
FRONT ELEVATION



Type 5 R Block B

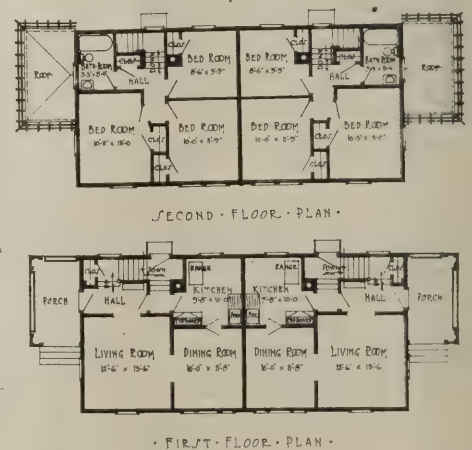
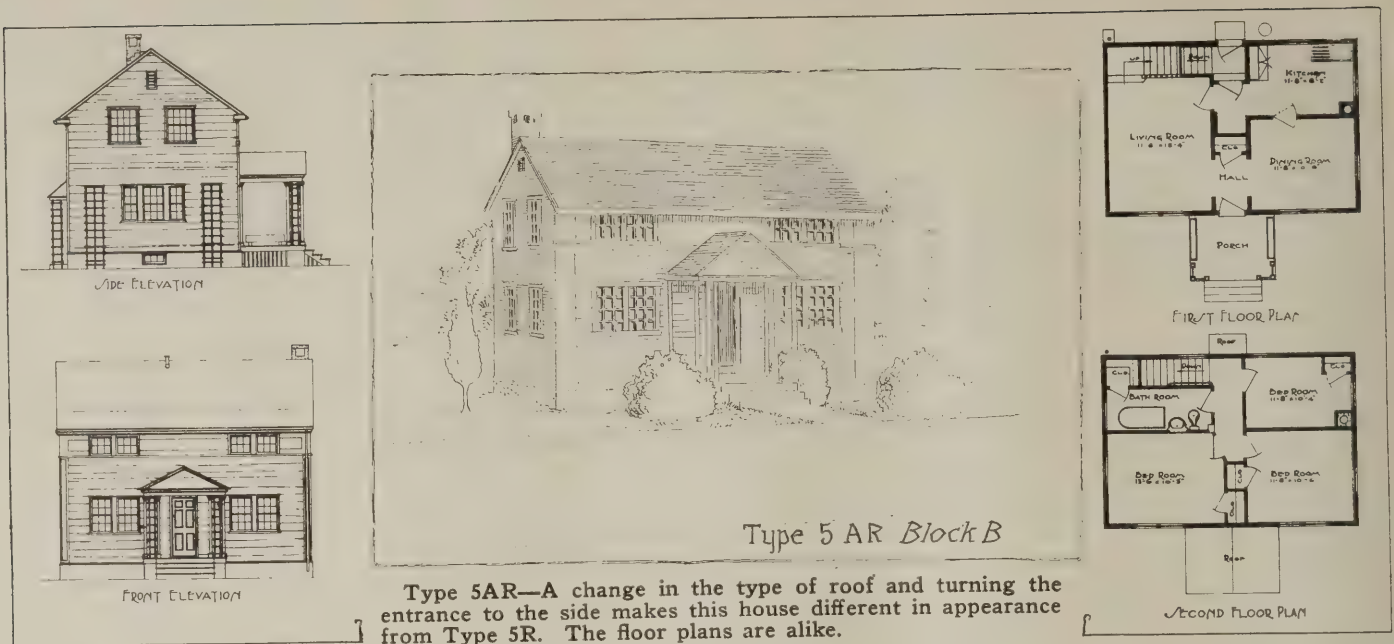


FIRST FLOOR PLAN



SECOND FLOOR PLAN

Type 5R—This type is almost the same as Type 2, but has three bedrooms, and the bathroom is rearranged.



Type 3 and 3A—The side entrances give more privacy than is usually obtained in double houses. The two chimneys might

be combined into one, running it through the party wall. Note that this plan is merely two Type 3 plans placed back to back.

Watertown is in proximity to ample stocks of lumber, shingles and other building material of wood. This, together with the fact that winter weather would be reached before the work could be well advanced with any other kind of building, led to the decision to construct the houses entirely of frame.

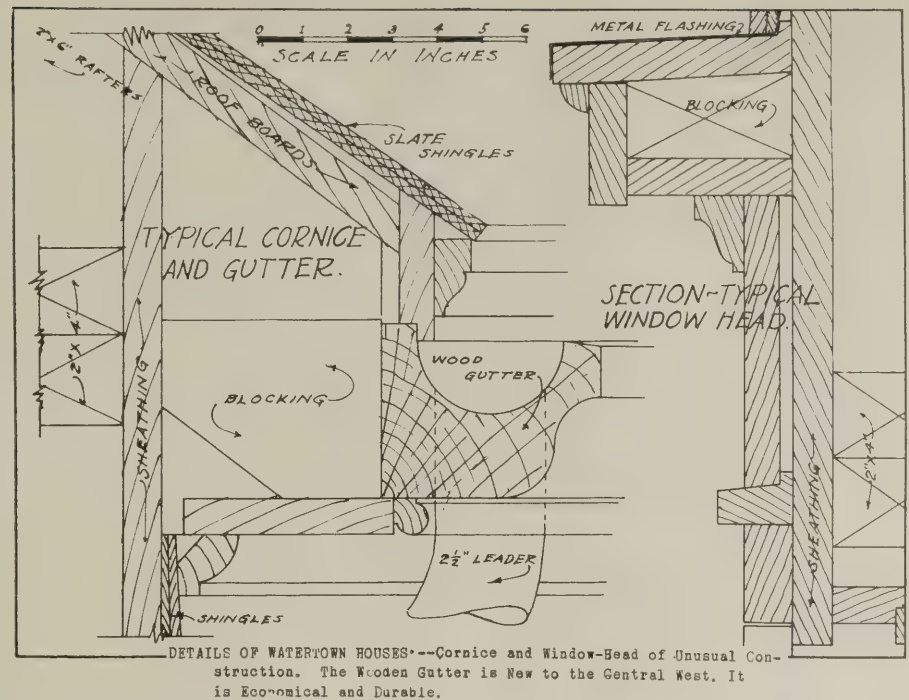
The plans and specifications call for first class construction in every way, such as concrete cellar, walls, integral waterproofing and foundation drains; outside walls above the cellar sheathed, papered and covered with shingles or

siding; double floors in first stories; two coats of plaster throughout; complete plumbing for kitchen, with sink, wash tray and gas range; complete bath rooms in second stories, furnace heat and electric lights throughout.

All types include grade entrance for

access to kitchens and cellars. No windows are used in any staircase. The bedrooms in all of the houses are arranged so that there are windows on two sides, except in the semi-detached groups, which have one bedroom with a window on only one side. A coat closet is provided in each first story, a linen closet in the second story, a medicine cabinet in each bath room and one ample closet in connection with each bedroom. Special attention has been given to the possible location of pianos and other furniture and all porches are of proper width to allow the hanging of swinging hammocks.

For the purpose of introducing variety in plan and design, five types have been adopted. The type numbers one and two having five rooms and bath and type numbers three, four and five having six rooms and bath. There is an equal number of five and six-room houses in the total. Each type of house has two variations in design, the type designated by a number and the variation by letters. There are also four semi-detached groups, each formed by combining two of the above, thus providing fourteen different exterior designs. In addition to this each design will be built reversed in



plan about as many times one way as the other.

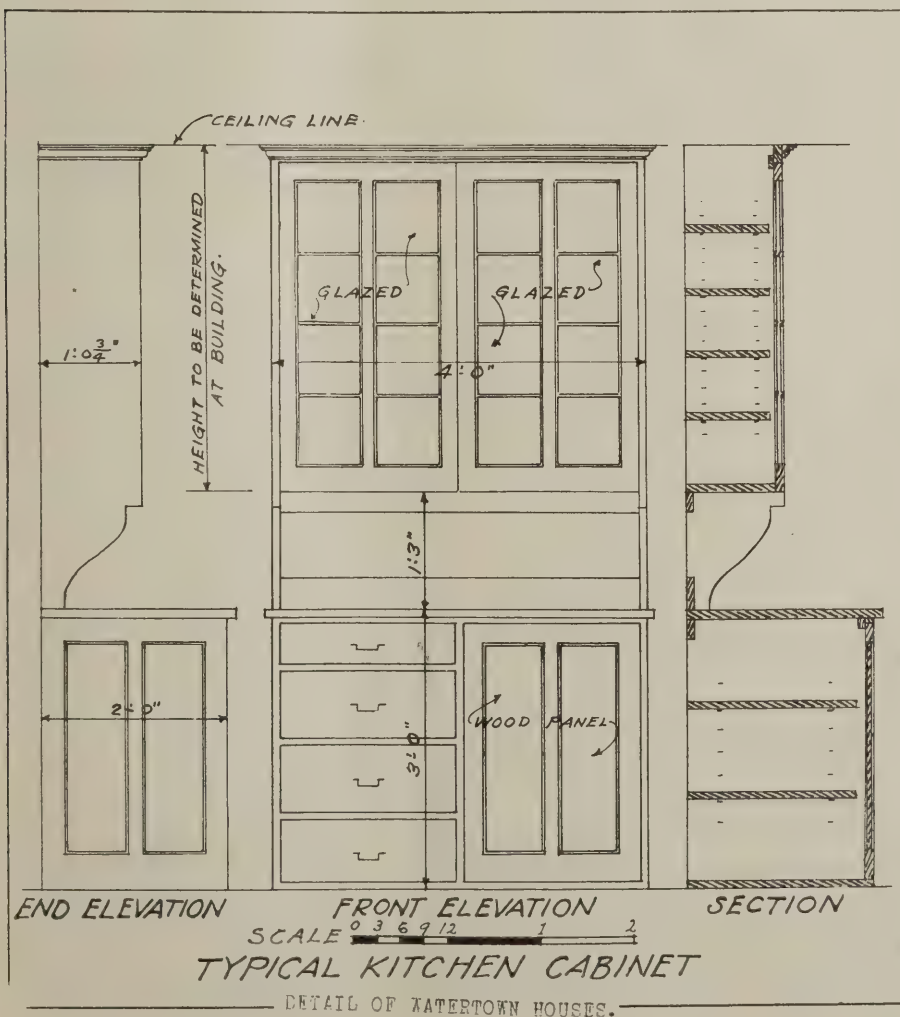
In order to obtain a still further variety in the appearance of the houses, different kinds of weather-boarding and

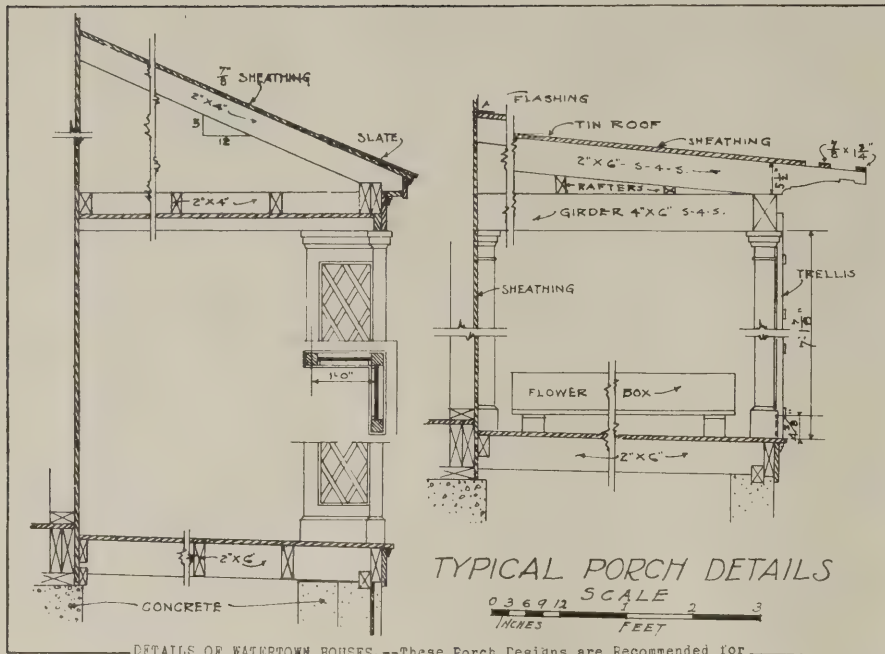
color schemes have been adopted. For example 40 per cent of the houses will have the walls covered with 16-inch shingles, 20 per cent. will have 24-inch shingles, 20 per cent. will have 6-inch siding and 20 per cent. will have 10-inch siding. Still further variations are obtained by the use of five different shades in wall shingle stains and three colors of paint for the 6-inch and 10-inch siding. All roofs are 16-inch shingles.

The plans have been conceived on the basis of the simplest rectangular forms and the designs have been carried out in conformity with the idea with roof surfaces unbroken, and all details treated in the least expensive way to obtain practical results, not losing sight, however, of the importance of proportions in the matter of window openings, porches and other features necessary to a comfortable and well designed house. The natural result is a simple cottage type design in complete accord with the farm and village houses in the vicinity.

Stained shingles will be of the silver and weathered grays, and white, trimmed with white, gray or cream to harmonize. The clapboard houses will have solid colors of either gray, white or cream. The lattice work and porch boxes, also here and there a front door, will have one of three shades of green, or soft gray brown, to establish a distinctive quality to each group.

Details of construction are shown in the accompanying drawings. The porch designs are worthy of special study as well as the unusual design of the cornices and window-heads. The wooden gutters, unusual in the west, are economical and durable, and will commend themselves at this time.



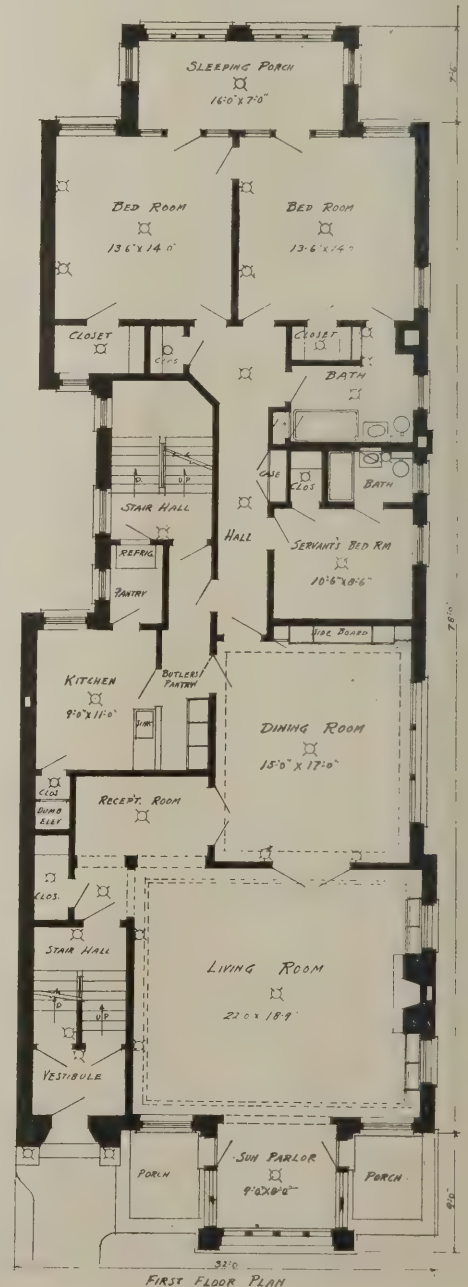
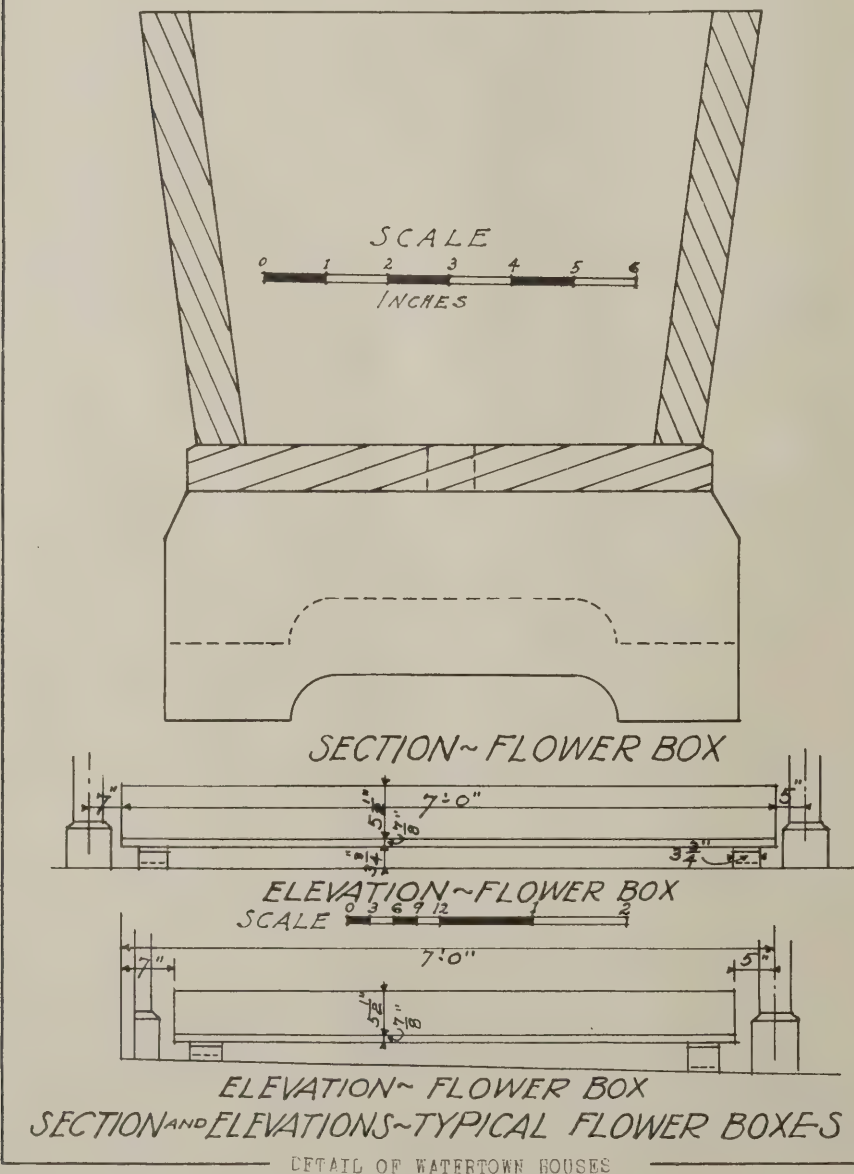


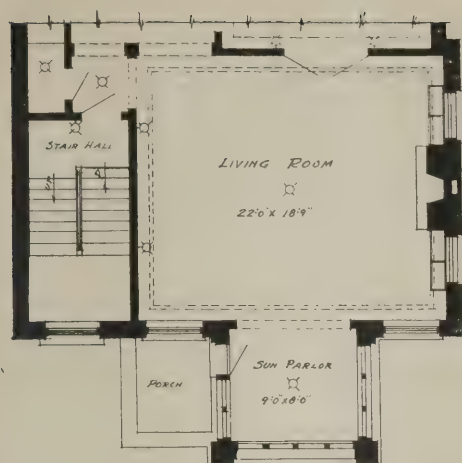
DETAILS OF WATERTOWN HOUSES.--These Porch Designs are Recommended for Study, and Use in Remodelling Work. Note the Effectiveness of the Simple Posts with Lattice and Trellis.

A THREE-STORY APARTMENT BUILDING

IN designing the exterior of apartment houses a great deal of attention must be paid to giving the building a distinctive appearance. We are all more or less guided by first impressions and if a prospective renter is struck by the favorable appearance of an apartment house he may overlook other features that are not so pleasing. This does not mean that the building must be entirely different from all that have gone before; it should not be different to the extent of being freakish. Neither should the plan be neglected; a good exterior suggests a good interior and if the plan is not practical the best front on earth won't rent the apartments.

Terra cotta trim is often effectively used to give distinction to an apartment building. It is useful for relieving blank





PLAN SHOWING 2ND & 3RD FLOOR FRONT ONLY
BALANCE OF FLOOR SIMILAR TO FIRST FLOOR

wall spaces, and if properly designed it gives a finished air to the building.

In this apartment building it is used to form window trim, buttress caps, belts, panel inserts, etc. The balconies are rather heavy in appearance and if the circle ornaments were pierced to let light through, it would probably be an improvement. The tile roof and the copper gutter add an air of substantial finish to the building. The real roof is, of course, behind this false roof and is of

the customary felt and gravel, flat roof type.

The plan is of the "English Basement" type; this idea may often be used for smaller buildings. It makes it possible to have a desirable three or four-room apartment at the front of the basement. Its use also raises the first floor high enough above the street to prevent every passerby from looking directly into the front room.

The relation of the reception room to the living and the dining rooms is convenient. The double hall is somewhat wasteful although one end of the rear stair hall forms a serving pantry between kitchen and dining room. One hall would be more appropriate for a small house. All of the rooms excepting the kitchen and the servant's room could be made somewhat smaller. The separation in this house is good; the sleeping quarters being well removed from the living room.

CHEAPNESS OF LUMBER

In spite of a repeated presentation of the facts of the case, misapprehension still exists in the minds of the public with reference to the comparative costs of building materials and many prospective builders still persist in waiting for

prices to drop. So long as other commodities maintain their present level, labor will be high and as a consequence building materials cannot be cheaper than they are at present. Some producers report that by exact figures, it is actually costing their mills more to make lumber than they can obtain for it in the market.

In recent tables of the Bureau of Labor Statistics of the U. S. Department of Labor, relative increases are listed on a basis of 100 per cent for 1913 prices. These are the per cents of increase:

	1913	Oct. 1918
	per cent	per cent
Farm products	100	223
Food	100	199
Cloths and clothing.....	100	253
Fuel and lighting.....	100	179
Metals and metal products	100	186
Lumber and building materials	100	157
Chemicals and drugs.....	100	204
Housefurnishings	100	233
Miscellaneous	100	197
All commodities	100	204

It will be noted that lumber and building materials show the least advance in price while clothing has the highest rate of increase. Not only this, but lumber and building materials are 22 per cent lower than the next item—fuel—and they stand far below the per cent of total increase as tabulated for "all commodities."



FRONT ELEVATION

Improving Hot-Air Furnaces

Abridged from a reprint by the U. S. Bureau of Mines of a paper read by Charles Whiting Baker before the American Society of Heating and Ventilating Engineers, Buffalo, N. Y.

Drawings from description by Jim T. Pomeroy

WITH most hot-air layouts it is possible, by a simple and inexpensive change, to effect a saving of 20 to 30 per cent in the coal required to heat the building in severe weather, and the building can be kept far more comfortable.

The Auxiliary Cold-Air Inlet

The plan here recommended is merely the addition of an auxiliary cold-air duct by which the air supply to the furnace may be taken from inside the house, instead of from outdoors, during very cold or windy weather.

There is, of course, nothing novel in this proposal. Hot-air furnaces have been installed on this plan for many years; and one might suppose that all hot-air furnaces would be built according to the plan here recommended, but for the ordinary dwelling it is a question of putting in equipment that will cost the least and sell the best, rather than what will give the best results in operation.

The Ventilation Bugaboo

The first objection, sure to be advanced by nine persons out of ten, when the change here urged is suggested, is that such a plan deserves summary condemnation because it provides no fresh air for ventilation.

The first answer to be made to this objection is that with either a steam or hot-water heating system, as installed in nearly all buildings of ordinary size, no fresh air whatever is provided for ventilation. A cold-air duct to the furnace from inside the house when opened only in very cold or windy weather will be used at a time when the fresh air coming in around the closed doors and windows furnishes as large a volume of ventilation as is demanded by standard health authorities.

A hot-air furnace, even when arranged to draw air from inside the house at all times, would still have a decided advantage over the steam or hot-water heating system as regards ventilation, in that it constantly tends to "average" the air content of the entire house. Thus, a room may have four or five people in it, while other rooms in the house are entirely vacant. With a steam radiator in the room the atmosphere will soon get close and stuffy; but with a hot-air furnace flue sending up a large volume of air drawn from the unoccupied rooms

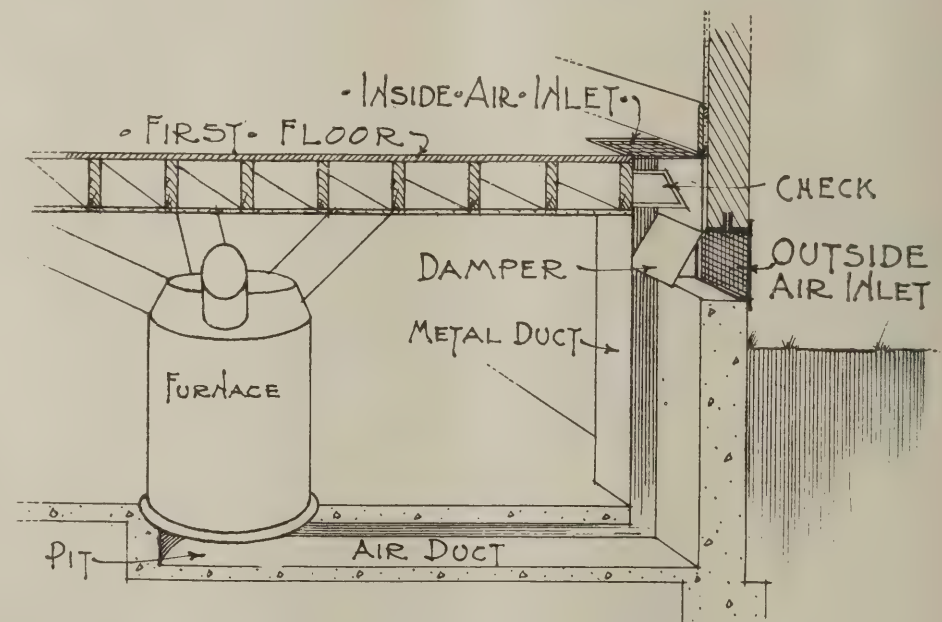
of the house, where natural ventilation is going on, the air in the occupied room will be rapidly changed.

Why the Interior Cold-Air Inlet Makes the House More Comfortable

It was remarked at the outset that by taking cold air from inside the house in severe weather not only would a large saving of fuel be effected, but the house would be much more comfortable in such weather. The reason for this is that a furnace can adequately heat a building when taking in air at 50° to 60° F., which it could not possibly heat when taking in air at zero or below. One great defect of the hot-air heating system as commonly installed is that while the

experienced with hot-air furnaces. He will now endeavor to show that a hot-air heating plant, properly installed, in a building of moderate size, has many important advantages over either steam or hot water.

Most of these methods are not at all novel, but have been in extensive use for years. Of some of them the writer himself made practical application in remodeling the furnace heating plant of his own residence in Montclair, N. J., some 15 years ago. There is nothing abstruse or difficult about these methods; and there is no reason whatever why any intelligent plumber who is competent to install a steam-heating system



Cement Furnace Pit and Outside Cold Air Duct and Metal Inside Cold Air Duct

upper part of the room is overheated the floor is cold. By taking the cold air from inside the house, the cold air that accumulates on the floors as a result of the natural ventilation at windows and doors is constantly being drawn off and heated.

Improvements in Design of Hot-Air Heating Plants Needed for Competing with Other Systems

The writer has shown how the addition to hot-air heating plants of an auxiliary cold-air duct drawing air from inside the house will save coal and overcome much of the difficulty commonly

should not instal with equal success a hot-air heating system on the principles here laid down.

In a rented house especially, the hot-air furnace, which has nothing that can freeze and very few parts to get out of order and require repair or adjustment, as compared with the steam or hot-water systems, deserves more serious attention from engineers than it has ever received.

Distributing Hot Air to Different Rooms

Perhaps the most common complaint regarding hot-air heating is the faulty distribution of the heat to different

rooms. A large volume of hot air will flow from the register in one room, while in another room the hot-air flue may persistently act as a downcast, the air from the room flowing into the register instead of hot air flowing out. The reason for this behavior is easily seen when the construction of the furnace and the various heating flues is examined. It will usually be found that the cold-air duct has a cross section perhaps one-fourth that of the combined cross section of the hot-air flues. The circulation in a hot-air heating system is produced, of course, by the tendency of the column of heated air in the hot-air flues to rise. This causes the air pressure in the furnace casing or hot-air chambers to fall slightly below the normal, and it is this suction that produces the inward flow from the cold-air duct. This slight vacuum in the hot-air chamber will often, when the furnace is first started and the flues are cold, draw cold air down one or more of the hot-air flues.

Obviously, the first essential for insuring uniform distribution to the different hot-air flues is to reduce the resistance to the flow of cold air to the furnace. In the hot-air heating plant for the writer's own residence, the cold-air duct to the furnace was given a cross-section equal to the combined area of all the hot-air flues. However, with a cold-air duct of such a size it would be impossible to heat the house in severe weather or when a strong wind was blowing into the duct. On this account, as well as for the reasons that have been reviewed above, the provision of an auxiliary cold-air inlet for taking air from inside the house in severe weather was necessary.

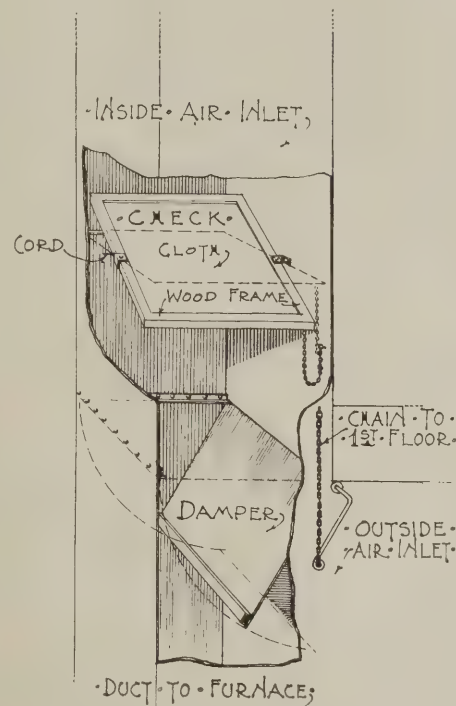
The cold-air inlet from inside the house has likewise a cross-section equal to the combined area of all the hot-air flues. These two cold-air ducts join to form one channel leading to the furnace. At the point of junction of the two ducts is a wing damper which can be swung around to shut off either the outside cold-air duct or the inside duct, or can be set at any intermediate position for taking any desired proportion of air from inside and outside the house. In any position of the damper, however, an absolutely free flow of cold air to the furnace is at all times certain. It is not possible by carelessness to shut off the air supply entirely and the furnace delivers a large volume of warm air instead of a small volume of intensely heated air. Not only is this conducive to health and comfort, but the risk of fire from overheated flues, which is one objection to the hot-air furnace as commonly installed, is avoided.

A Frictionless Check Valve

With the described arrangement of cold-air ducts one problem arose which

required some study for solution. Of course, the draft produced by the hot-air flues of the furnace is very small. Occasionally with the wing damper set, as it usually is, to take part of the air supply from outdoors and part from inside, a strong current of cold air from outdoors would flow around the end of the wing damper and backward up the other cold-air duct and would issue from the register opening in the hall. This back draft could be stopped, of course, by closing with the wing damper either one of the ducts, leaving the other entirely open; but such an adjustment was often undesirable. What was needed, evidently, was a check valve in the inside cold-air duct which would offer no obstruction to the normal downward flow but would automatically close as soon as this flow stopped and thus prevent the back draft.

The check valve installed consists of a very light wooden frame cov-



Automatic Draft Check

ered with the cloth commonly used for window shades. This was hung in the vertical cold-air duct from the first floor in an inclined position and was suspended on trunnions near the center of gravity, so that the damper would swing closed by its own weight but would open under the slightest suction from the furnace. In order to eliminate friction in the movement of the damper, the trunnions by which the damper is hung are small cords. The damper has a slight clearance at the sides, so that the only resistance to its movement is the almost infinitesimal resistance of the cords to twisting.

In order to accurately balance the damper a very light chain was hung in

a loop, with one end attached to the side of the flue and the other to the side of the damper. By altering the length of this loop of chain it was easy to adjust the damper, notwithstanding its comparatively crude construction, so that it would close gently by its own weight and yet would open with a puff of breath. This simple apparatus, which was made and installed in a few hours, has operated perfectly for years with no attention whatever.

Disposal of the Cold-Air Ducts

A hot-air furnace should, of course, be placed as near as possible to the center of the building it is desired to heat. For buildings of good size the installation, in the headroom available, of a cold-air duct of the dimensions above specified, from the outside wall to the furnace, is not an easy matter. This is another reason why one may read in books about cold-air ducts equal in cross section to the combined area of the hot-air flues, but will seldom find one actually installed.

In the writer's own residence, this problem was easily solved by carrying the cold-air duct underneath the concrete floor of the cellar. The floor and walls of the duct were molded in concrete. For the top of the duct slabs of reinforced concrete were cast in open frames, and were about 3 inches thick, 3 feet long, and 2 feet wide, with beveled edges. After these slabs were seasoned and placed the grooves where they joined were filled with poured concrete and made tight. The cellar floor is commonly washed down with a hose without any water reaching the cold-air duct.

Another unusual feature in the installation was placing the furnace in a pit, with concrete floor and sides, about 2 feet lower than the level of the cellar floor. This made easy connection from the cold-air duct to the base of the furnace and saves labor in feeding coal to the furnace, while the extra height helps the draft in the hot-air flues, especially those to the first-floor rooms.

An Automatic Humidifier

A refinement in connection with this plant, which is seldom found in hot-air furnace systems—or for that matter in connection with any other system of house heating—is effective provision for moistening the air. It is true that hot-air furnaces commonly have a so-called water evaporating pan or tank near the base of the furnace. However, numerous tests have demonstrated that the amount of water evaporated by such an apparatus, situated at a cool part of the furnace, is too trifling to have any material effect on the humidity of the air in the rooms.

In order to provide means in the furnace installation being described for evaporating sufficient water to have a material effect on the humidity of the

air, and this without the necessity for any attention, there was installed in the hot-air chamber of the furnace, immediately over the fire pot, a cast-iron evaporating pan, which can be furnished by any local manufacturer. This pan is supplied by a pipe from a small copper tank outside the furnace, the water in the tank being at the same level as that in the evaporating pan. The supply to the tank is controlled by a float valve similar to that on an ordinary water-closet tank. An overflow pipe from the copper tank is provided to prevent the water rising so high as to flood the cast-iron pan in the furnace in case the float valve should fail to operate. This simple and inexpensive humidifier is automatically self-regulating, requiring no attention from one year's end to another. In cold weather, when the furnace is very hot and discharging a large volume of air, the water is heated to a higher temperature and is more rapidly evaporated.

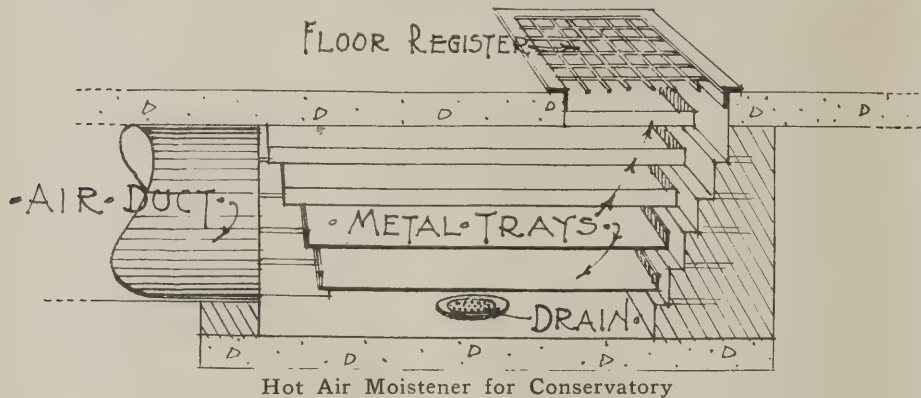
There is no more need for humidifying

back. Shallow, rectangular pans of galvanized iron, 1 inch deep, are made to fit these shelves and are of different lengths from top to bottom, the shortest being at the top.

This chamber is covered with a reinforced concrete slab for three-fourths of its length, next the house wall, and the other one-fourth has a register opening. A 12-inch flue extends from the hot-air furnace thru the cellar wall into the rear of the chamber.

There is a hose in the plant room for watering the plants, and after the daily watering is done the hose nozzle is turned down the register and discharges into the topmost galvanized-iron pan. This pan overflows into the one below, and so on until all are filled and any surplus or leakage runs off thru the drain.

The hot air from the furnace, in passing thru this chamber, has to flow in horizontal layers, only 1 inch thick, over the water in these pans. About 50 square feet of water surface is thus



Hot Air Moistener for Conservatory

the air in a house heated by a hot-air furnace properly installed than there is in a house heated by a hot-water or a steam system. It is of interest, however, to point out how simply and inexpensively moisture can be added to the air in a house heated by hot air, in comparison with the difficulty of doing the same thing with a steam or hot-water apparatus.

Moist Air for a Conservatory

A small plant room heater has a special system for moistening its hot-air supply. The plant-room floor is only an inch or two below the level of the first floor of the house and is of concrete paving on an earth fill. In this fill, next the cellar wall, there was constructed a chamber about 16 inches deep, 2 feet wide, and 4 feet long for the hot-air flue. This chamber has a concrete floor, and a drain leads out from it at the bottom and connects with the system of underdrains beneath the concrete floor of the plant room. The sides of the chamber are of brick, and widen toward the top so that at each course of brick there is formed a narrow shelf an inch wide, extending from front to

exposed to evaporation, and the dry air from the furnace takes up the water like a sponge. The entire installation was simple and inexpensive of construction and has been in use for many years with entire satisfaction.

Furnace Construction

It will, of course, be understood that the writer, in discussing the comparative merits of the hot-air furnace system and its competitors, has in mind only the class of buildings, chiefly private dwellings, to which the hot-air furnace is adapted. Nor does he wish to be understood as claiming that the furnaces now made are free from defects. In addition to disadvantages previously mentioned, most hot-air furnaces scatter dust thru the house because of the sifting of ashes from the fire box thru open joints in the furnace into the hot-air chamber, whence they are carried into the house thru the hot-air flues. Admittedly it is difficult to make a cast-iron structure which will be free from this defect under the extremes of temperature that a hot-air furnace has to undergo, but there is plenty of room for improvement.

Another common defect in hot-air furnaces is crude workmanship. It is common to find draft openings which allow so much air to leak thru when closed that in mild weather the fire can only be kept down by partly opening the furnace door, always a very wasteful plan, so far as fuel consumption is concerned.

Another defect is inadequate passages for air thru the furnace. This, as well as too small a cold-air duct, is often responsible for the difficulty of distribution to the different hot-air flues.

On the other hand, the ability of the hot-air furnace to heat a house with a light fire in mild weather, in spring and fall, is a very great advantage over the steam heater, as respects both fuel economy and comfort.

The simplicity and reliability of the hot-air furnace and its infrequent repairs and breakdowns are important merits. With better design in furnace construction, and more intelligent installation, the hot-air furnace should fill a far larger place in the house-heating field even than it has filled in the past.

SENSE IN CUTTING PRICES

A Casper, Wyoming, contractor writes: "In an article printed in the February NATIONAL BUILDER, I find the following statement, 'being busy does not mean anything unless the results show in the bank book.'

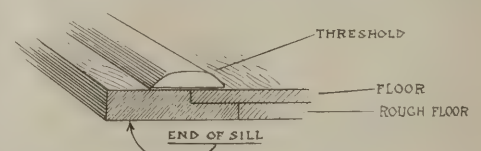
There is no need to worry about the results **if the job is done as it should be.**

I have often taken jobs at cost and in some cases below cost, for the following reasons: to keep my men busy, for advertising purposes, and because the more work a man has on his hands the more work he will get, as every job properly done will bring another job. One mistake that a great many contractors make is taking a job cheap and **doing cheap work**, in which case the job never brings them any after returns."

Our friend adds: "Think of the money being thrown away for booze by laboring people, that will soon go for homes on monthly payments."

RABBETED SILL FOR DOOR FRAMES

Chas. Nyland, Brainerd, Minn., writes: In putting in outside door frames I rabbet out the sill on the inside one inch



wide and $\frac{1}{8}$ inch deep for the top floor to lap over on the sill under the threshold. It makes a tight joint and binds the frame to the floor.

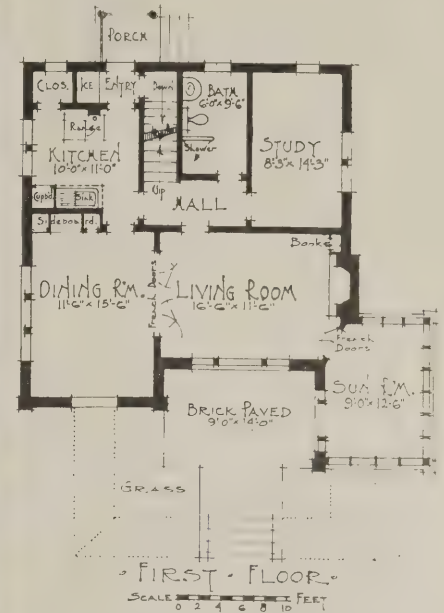
A House Planned by a Builder's Wife

THE house illustrated here is the home of Mr. and Mrs. Gravenstreeter, of Cleveland, Ohio. Mr. Gravenstreeter is a builder. He built the house from the working plans designed and drawn by his

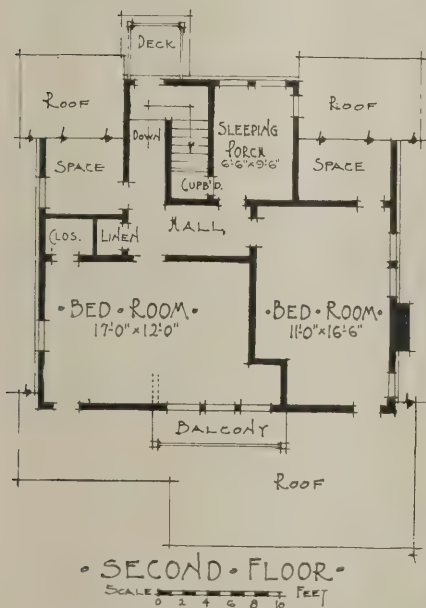
ting a house just as she wants it without working through the medium of another mind to express her ideas.

Among other things that make this house unusual is the open porch which

the stair away from the front part of the house and between two walls, was not only to cut down expense but also to simplify the housework,—it takes a lot of time to dust forty or fifty balusters.



The small sign board on the porch—just around the corner of the sun room—states that the man who lives here is a contractor and builder. This is forceful advertising. The house draws attention by its attractiveness, and the sign implies that the builder is ready to tackle another house and make it just as attractive as this one.



Much of the charm of this house is due to the skilful use of small wooden accessories painted white; thus repeating the color of the wide brick joints. It requires extremely good taste not to overdo a treatment of this kind.

wife, and the reproductions here shown were taken direct from these working plans.

This is an instance of a woman get-

ing a house just as she wants it without working through the medium of another mind to express her ideas. The entrance is from this porch directly into sun room. The reason for placing the

The placing of the bath room on the first floor seems odd, but it is more convenient to reach in day time and for that reason the location is practical. A

shower was installed instead of a bath tub and the substitution has not been regretted. The shower is cheaper; is more sanitary and requires very little attention.

The construction is brick veneer on hollow tile, with frame construction above the second floor joists. The win-

dows in the first story have reinforced concrete lintels, and a cement water table is used between the frame construction and the masonry. The roof is of slate. The bath room has a tile floor and wainscot. Oak trim and oak floors are used throughout the first story.

The basement floor offers something new in construction. It is made of four inch vitrified hollow tile covered with a coat of cement mortar two inches thick. This floor is said to be dust dry when the neighbors' cellars are flooded. The cost of the house was \$5,000.

Farm Bungalow of Cement Stucco Construction

By Charles Alma Byers

THIS bungalow is located on a small ranch near Modesto, California, and was built from plans prepared by E. W. Stillwell, of Los Angeles. The builder, as well as owner at the time, was C. M. Smith, who says the total construction and equipment cost, exclusive of his own labor, was but \$2,250. He estimates that, under contract, it probably would have cost a little less than \$3,000. It was built, however, about five years ago, before the present higher prices of building materials and labor, and therefore its duplication now might run to

well balanced and graceful, and its color scheme pleasing and somewhat striking. The arrangement of the rooms is convenient, as well as economical of the floor space, while in finish and decorations it is attractive, cozy and home-like. Achieving a very material saving in the furnishing cost, there are many well-planned built-in features.

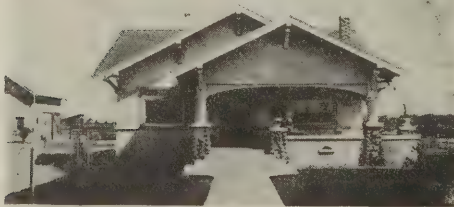
This bungalow occupies a cross-roads corner. It is therefore provided with both a front and a side entrance, each of which is sheltered by its separate gable-roofed porch. These porches—

porches and terrace, however, the base for the stucco is of common brick, finished with a capping of solid cement, while the chimneys and porch piers are clinker brick. All stucco work is of light creamy tint, and the exposed brick masonry is naturally a deep red. To these color shades is added a green shingled roof and a considerable amount of trimming done in a rich dark brown, completing a very effective color combination.

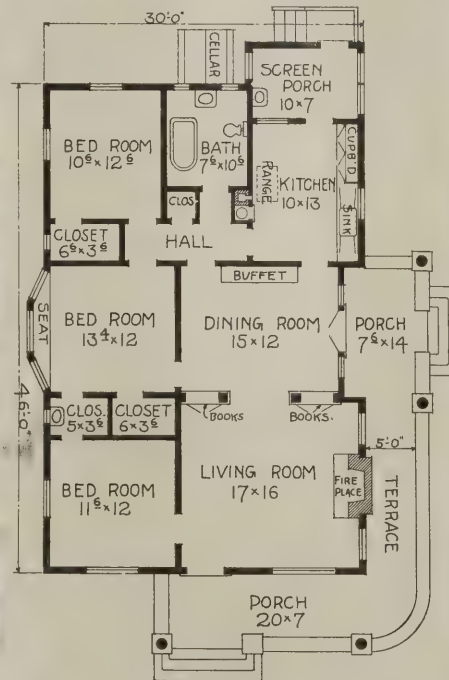
Details deserving of special mention are the little touches effected through



The Bungalow



Front View



From the Side Street



From Opposite Side Street

\$4,000, or more, depending on local conditions. As a basis for present computation, it may be stated that prices of materials and labor prevailed at the time of its construction as follows: Carpenters, per day, \$4.00 to \$4.50; masons and plumbers, \$6.00; plastering inside, 30 cents per square yard, and for outside, with pebble-dash finish, 40 cents per square yard; cedar shingles, \$3.25 per thousand; common lumber, \$22.00, and slash-grained Oregon pine, \$70.00.

The structural lines of the house are

each seven feet deep—are, however, connected by a five-foot open terrace; and both this terrace and the two porches are enclosed by a low cement wall and also floored with cement. The entrance on the front leads directly into the living room, and the one on the side, consisting of a pair of French doors, gives access to the dining room.

The house, resting on a concrete foundation, is of frame construction, surfaced outside with cement-stucco over metal lath. In the low walls of the

the trimming or finishing timbers—such, for instance, as the design of the gable brackets and the employment of the water-table that belts the walls on line with the bottom of the principal windows. For a house of this type, to keep the walls from appearing too plain, it is quite necessary that the trimming be rather prominent, and at the same time well balanced, and this matter is here handled exceptionally well.

In the floor plan very little space is devoted to hallway, and yet access to

the different rooms is planned conveniently. The only hall, but twelve feet in length, in fact, constitutes a link between a total of five rooms, and also contains a closet.

Of built-in features the living room contains a box seat at one side of the fireplace and a low book-case at the other, besides a buttress book-case at each side of the open passageway to the dining room. All of the cases are provided with glass doors. The dining room has a buffet, consisting of a combination of china-cupboards, drawers, countershelf, and so forth. The kitchen is well equipped with the usual cupboards, cabinets and sink, as well as a water heater. The bath room, in addition to the usual fixtures, contains a wall medicine-case and a cabinet of linen draw-

ers; and one of the bed rooms has a box seat in a three-window bay. For each of the three bed rooms there is also a roomy closet, two of them possessing an outside window. One of these closets further serves as a passageway between the two front bed rooms, and is equipped with a lavatory. The rear entry porch has a stationary laundry tray.

The woodwork of the interior is of clear pine throughout. In the living room and dining room it is stained to imitate fumed oak, and elsewhere it is enameled in white. The dining room is finished with a paneled wainscot and plate-rail, while the wall space above is papered. Paper is also used in the living room and two of the bed rooms. Hardwood floors are in the two main rooms and the hall, and pine elsewhere. The

fireplace of the living room is of brick construction, of rather massive proportions.

There is a large basement or cellar underneath the rear, occupying the space covered by the rear bed room and its closet, the bath room, the hall, the kitchen and the greater part of the screened porch. It is both walled and floored with concrete, and is reached by an outside stairway.

The house is of particularly warm and substantial construction. It is heated throughout from a basement furnace, which represents a cost, installed, of \$150. Being located near a small town, it has all of the usual modern conveniences—gas, electricity and running water—and the fixtures are of good quality and attractive design.

A Building Specialist

THIS is a story about a builder who liked to do a first-class job of stair-building, or putting down a hardwood floor so that it looked like a piece of stretched silk, and wanted to do all of those special things "in a neat and workmanlike manner," and then some. But he was a general contractor, and his time had to be divided between plumbing, wiring, heating, grading, masonry, framing, and all the other structural work. He didn't have time to oversee his detail work and it was often bungled by workmen who had plenty of skill, but no ability to think for themselves.

This builder finally decided that he was a round peg in a square hole and began to look around to see what could be done about it. Then the idea came to him, that as all other professions had their specialists, why not a *building* specialist. Why not pick out the things that he liked to do; study up on them; get a picked crew of workmen together and start out?

He did just that. Gave up a profitable contracting business; organized a force, and opened up the attractive place of business shown in the photograph. He obtained the agencies for a number of high grade building products, office fixtures, tiling, store fronts, etc., and in this way he cut out several middlemen's profits and also obtained better deliveries.

The other builders of the town are only too glad to turn over their special work to him, as it relieves them of that much direct responsibility and they feel that the job will receive first class supervision.

Another thing, they know where they can always get expert help right at home, and they are not handicapped in



Showroom of a Builder who has made a Business and a Reputation by doing Special work in an Excellent way.

bidding on high grade work on that account.

This building specialist does not altogether confine himself to doing work for general contractors. In fact the most of his work is done on a direct order from an owner. Someone wants new screens or a new store front, and he naturally calls in the building specialist to do the work.

The shop is a model. The show window always contains an attractive display of building specialties and the interior is as clean and attractive a show room as you ever saw. Along the walls are samples of the building specialties for which the proprietor is the agent. In addition to these there are doors, windows, stairs, veneering, etc., all in various stages of completion so that anyone can see exactly how such things should be made.

The women folks feel perfectly at home in this show room and they are just as eager to see how things are put together as the men are. Women on shopping tours drop in just to look around and they go home with new ideas that often result in a nice order for the building specialist.



C. E. SEYMOUR
Building Specialist

High grade qualities that distinguish a man's work so that it is recognized as his by its thoroughness and workmanship is an asset that comparatively few can obtain. A reputation in the trade is sustained by a trade-mark. It is something to live up to. Better building and



a closer study of modern needs, a throwing overboard of old-time practices and business methods that have been imitated and followed without other reason than imitation, are indicated by the trade-mark of a producer such as a builder. It is in effect a guaranty of his work. This specialist in building uses his trade-mark liberally. It is used as a sign over his door. It is on his stationery, on his delivery labels, on his advertising—and he advertises diligently and effectively.

Built-In Wardrobes vs. Closets

A BEDROOM is not complete when it has no convenient provisions for putting away clothing that is not in use. Closets have long been accepted as answering this purpose, but the average closet is usually unsatisfactory. They are often deeper than necessary and if they are wide enough the corners are usually dark. To locate anything in the most of them requires searching.

In up-to-date houses the built-in wardrobe is substituted for the closet. Its double doors permit the whole in-

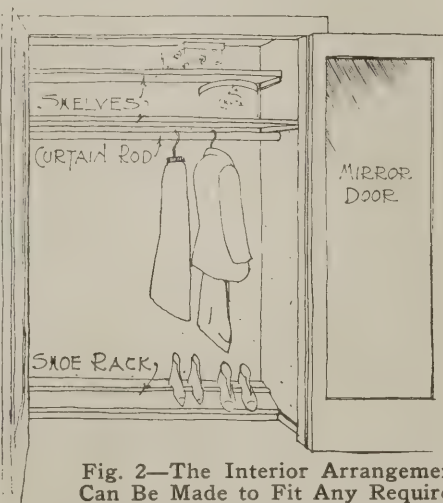


Fig. 2—The Interior Arrangement Can Be Made to Fit Any Requirement. The Added Mirrors are Very Popular.

terior space to be exposed to view and there is no trouble about laying your hand on anything that it contains.

they are comparatively shallow, 2 feet in the clear is deep enough; they use up little floor space—see Fig. 1. The walls may be kept thin by setting the studs flatwise, thus making the wall only a little over 3 inches thick including plaster on both sides.

Wardrobes may vary from 3 feet 6 inches wide, with 1 foot 6 inch doors, to 6 feet wide, with 2 foot 6 inch doors. In Fig. 2 the wardrobe ceiling is about 7 feet above the floor and two wide shelves for hats, etc., are provided, the lower one about 5 feet 3 inches above

the floor. Just below the lower shelf a length of curtain rod is cut in to receive clothes hangers. A shoe rack at the bottom completes the essential requirements. This rack is made of a 1x12 inch plank sloping to the front and has a 1 inch half-round strip along the back to catch the shoe heels on. Full length mirrors for milady's convenience are sometimes placed on the wardrobe side of the doors. If mirrors are used on narrow doors the stiles must be kept quite small, say 2½ inches wide.



Fig. 1—Built-in Wardrobes are Arranged Between Walls.

terior space to be exposed to view and there is no trouble about laying your hand on anything that it contains.

The general floor plan, of course, governs the location of wardrobes, but if they are placed between two bedrooms they will usually work out well. As

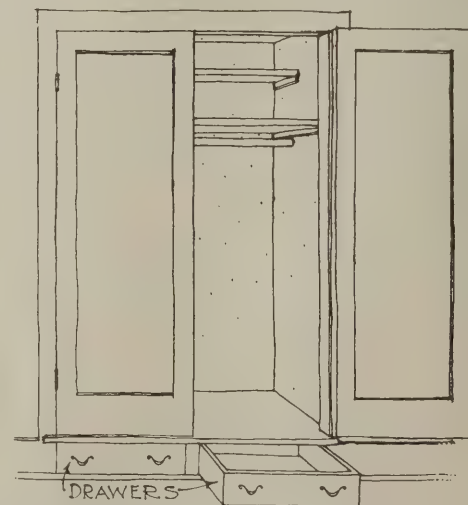


Fig. 3—This Variation in Arrangement Raises the Floor of the Wardrobe to Escape Ground-dust

in order to have the glass wide enough to be of any practical use.

Fig 3 shows a variation of Fig. 2 in that the shoe rack is replaced by

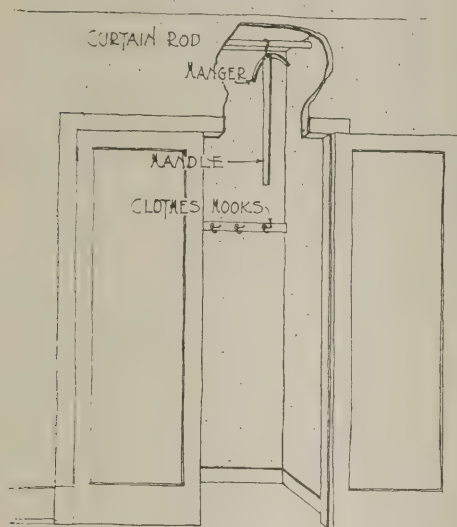


Fig. 4—Designed for a High-Ceilinged Apartment. Where it is Desired to Use All the Space

drawers. It is supposed to offer more protection from dust because it raises the wardrobe floor above that of the room.

If the bedroom ceiling is high, and it is desired to utilize the space above the wardrobe it may be done as in Fig. 4. This wardrobe has a ceiling height the same as that of the room, and the curtain rod is placed just below the ceiling. A wooden handle fastened to an ordinary clothes hanger makes it easy to remove the hanger from the rod. Ordinary coat hooks for hanging up lighter articles of clothing can be placed about 5 feet from the floor. This type of wardrobe is not so scientific as the one illustrated by Fig. 2.

A type like Fig. 5 is also used to utilize the space over the wardrobe. The upper cabinet may be lined with cedar and used to store unseasonable clothing. The defect of this type lies in its looks; it has a sort of overdone feeling. Efficiency can sometimes be carried too far at the expense of appearance.



Fig. 5—Utilizing the Upper Space of this Cabinet as in Fig. 4 and Lining it with Cedar it Serves for the Storage of Unseasonable Clothing

A Four-Room House

HERE is a neat, inexpensive, little home. It is 22 by 22 feet, and has four rooms and bath room.

Through the craftsman door one enters a combination living and dining room, that is made very cheerful by a large double window on the side.

Especially light and airy is the front bed room, which has three large windows and a large closet.

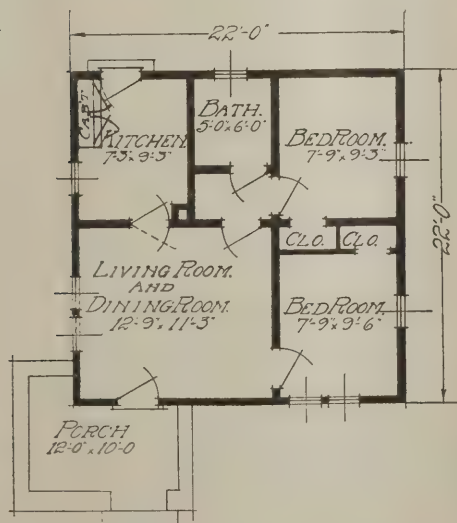
At the rear of the house we find another bed room with plenty of light and

well lighted, and has a rear door. This room is large enough to permit of the effective arrangement of all necessary kitchen furnishings.

By a small, inexpensive addition to take the place of the kitchen, which could then be turned into a dining room, you would have a five-room house. This is only a suggestion, the house is complete as it stands.

There is proportionately as much ar-

chitectural thought put on this little home as on larger houses, and it shows in the appearance. The hooded entrance extending over the door and the large, well designed balcony, give a hospitable and inviting appearance to the entrance. The large, double window with its flower box, the artistic trellis, and the two little windows peeping from the eaves of the roof, all lend a harmonious exterior that immediately arrests favorable attention.



a large closet. A small house needs plenty of storage room.

The kitchen is of good proportions,



PUTTING UP AND TAKING DOWN A TABERNACLE

That any other structure but hollow tile should be used for a building to be erected in a short time and taken down again after it had served a brief purpose, would seem reasonable. But it was not from choice, but necessity, that the building committee in charge of the Billy Sunday campaign at Boston, Mass., used hollow tile for the exterior walls of the tabernacle. The fire prevention campaign was at its height, and the tabernacle site being within the city limits, the then building commissioner of Boston required the walls to be of masonry construction. The building was located on the old baseball grounds, within a mile of the center of Boston, close to the Y. M. C. A. building and near the large United Drug Company buildings.



The Billy Sunday Tabernacle at Boston—Built to Be Taken Down

The building was designed in the usual method of tabernacles built throughout the country by the Billy Sunday Architects with the exception, that the exterior walls were of 5"x8"x12" hollow tile with pilasters built of closures. The inside arrangement was exactly the same as other tabernacles

throughout the United States. The illustrations show the tabernacle during process of construction, and the south end of the building after completion where the maximum height was thirty feet behind which the choir was located. The till was left with the smooth surface exposed, and the joints neatly struck.

It was a part of the contract with the builders who furnished and erected the tile, to dismantle their work after Billy Sunday had completed his conversions in Boston, and the tile was taken down and sold to build a schoolhouse in Concord. The exterior walls of the school were built of 5"x8"x12" with a facing of gray brick. An official of the town of Concord facetiously remarked that "the tile so used were holy in more ways than one."



The Billy Sunday Tabernacle in Process of Construction

NATIONAL "OWN YOUR OWN HOME" BUREAU WILL AID YOU TO GET STARTED WITH A BUILDING CAMPAIGN

The National Federation of Construction Industries announces the creation of a National "Own Your Own Home" Bureau as a division of the U. S. Department of Labor. The Bureau is composed of Representatives of the Association of Real Estate Boards and the U. S. League of Local Building and Loan Associations. The National "Own Your Own Home" Bureau will operate as a Government agency.

A complete plan of campaign is now ready for distribution to those who are interested.

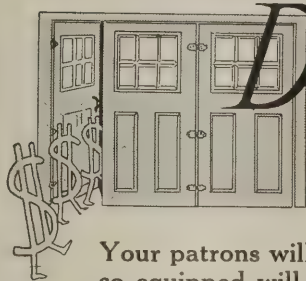
Requests should be sent to National "Own Your Own Home" Bureau, care Department of Public Works & Construction Development, Department of Labor, 1607 H Street, N. W. Washington, D. C.

Persons who are interested in the work of the National Federation of Construction Industries should communicate with its General Offices at 757 Drexel Building, Philadelphia, Pa.

The
Farm House
Competition
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in the
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May 15,
1919

MORE SCHOOLS MUST BE BUILT

The war revealed an extent of illiteracy in America almost unbelievable. Secretary of the Interior Lane points out that there are 700,000 men of draft age in the United States who can not read or write in English or in any other language. There are 5,500,000 persons over ten years of age who can not read or write in any language. The regular army never enlisted illiterates, but the draft act brought into the army approximately 35,000 illiterates and as many more who were almost illiterate. These soldiers could not sign their names. They could not read the manual of arms. They could not read their letters or write home. They could not read their daily orders posted on bulletin boards in camp. They could not understand signals in time of battle. The economic loss through illiteracy is estimated at \$825,000,000 a year, on the conservative assumption that the productive labor value of an illiterate is less by only 50 cents a day than that of an educated person. Ten per cent of our country folk can not read or write a word. In view of these facts, Secretary Lane urges an appropriation for a systematic campaign to eradicate adult illiteracy.



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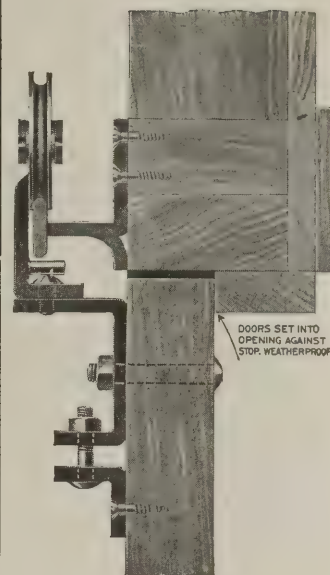
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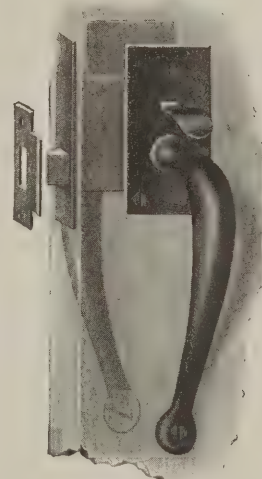
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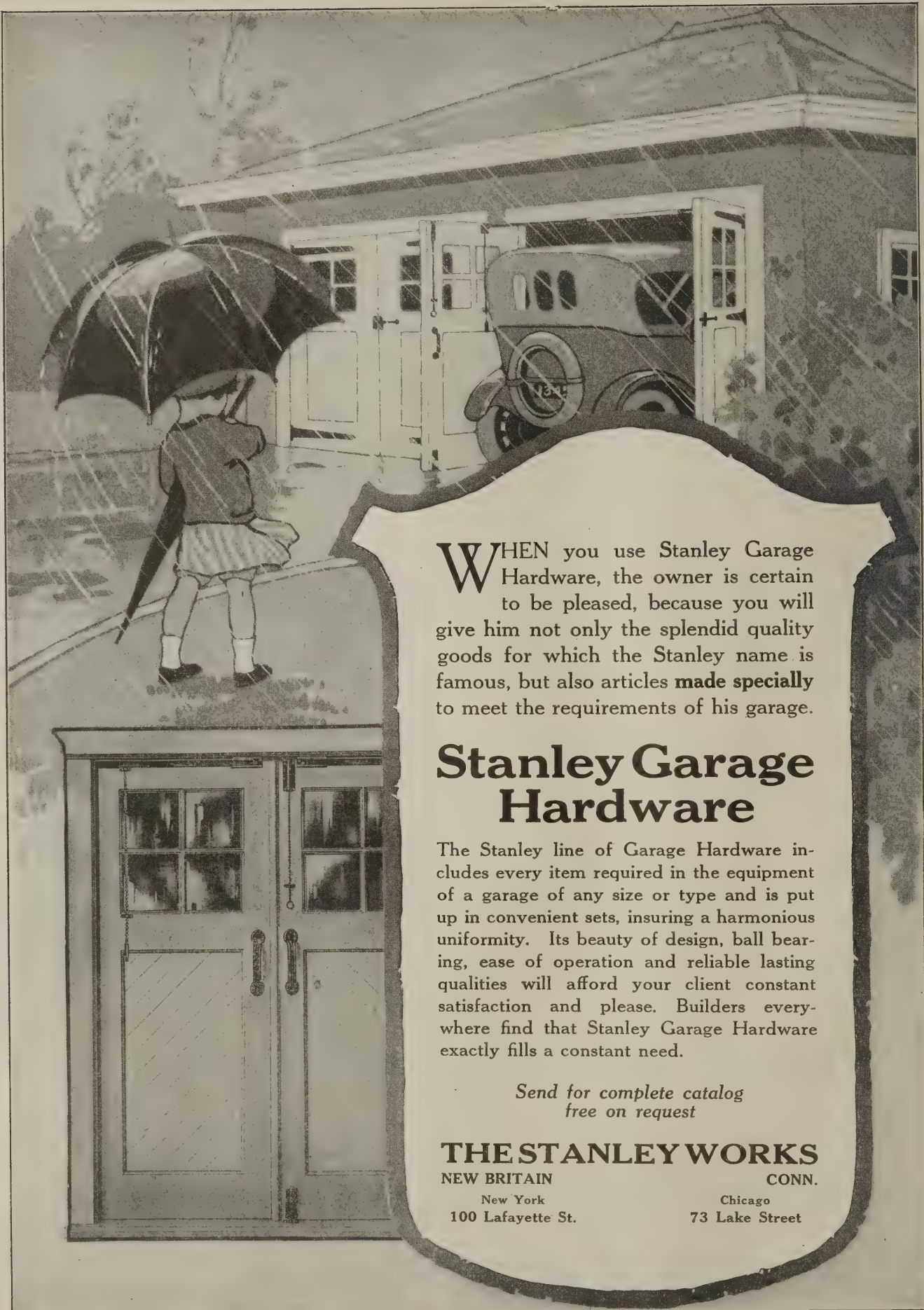
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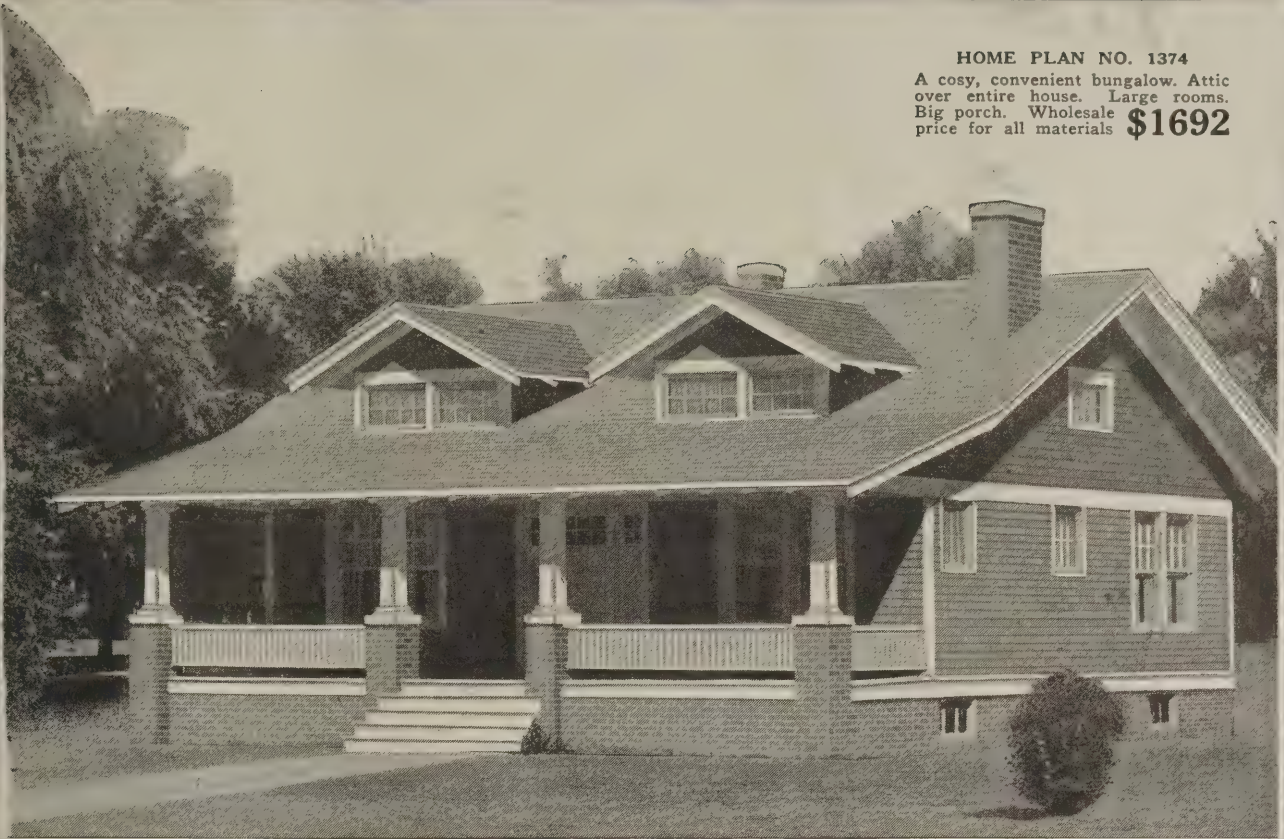
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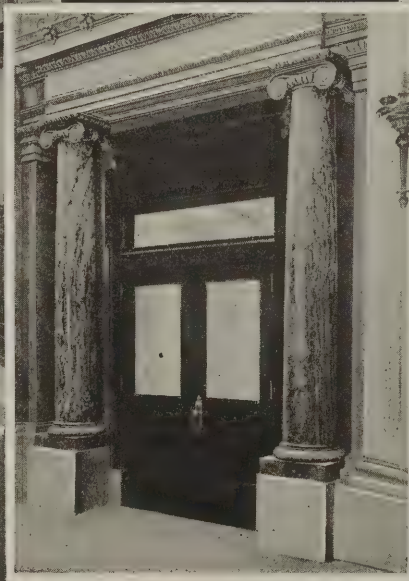
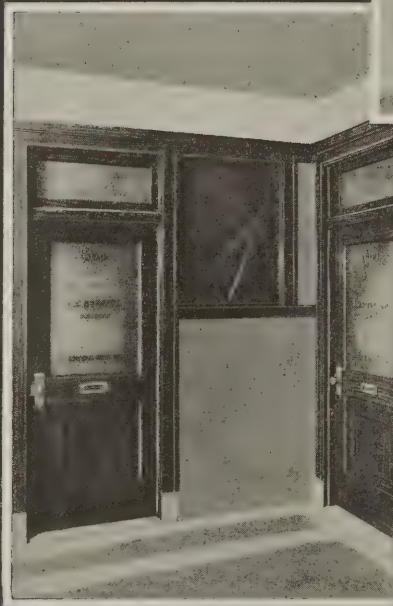
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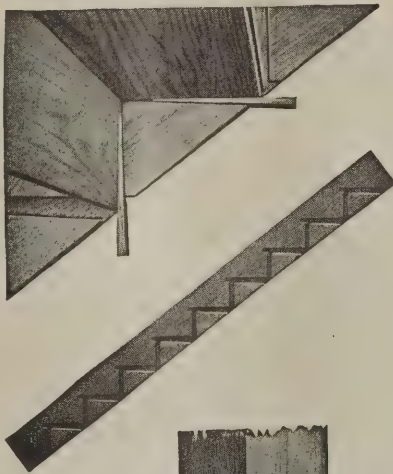
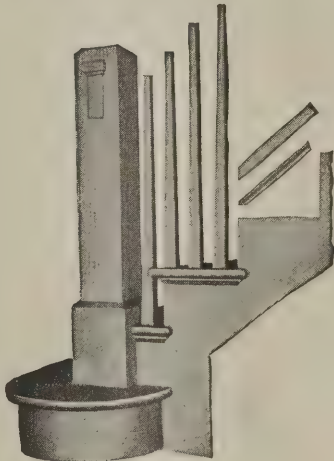
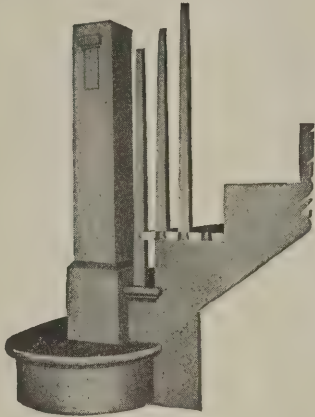
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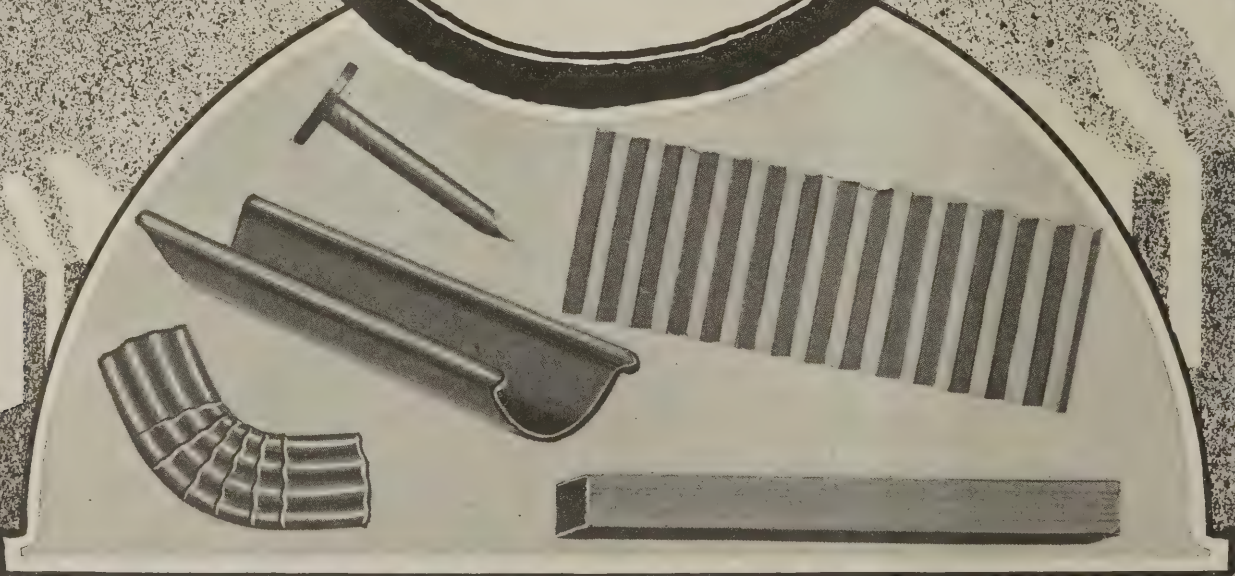
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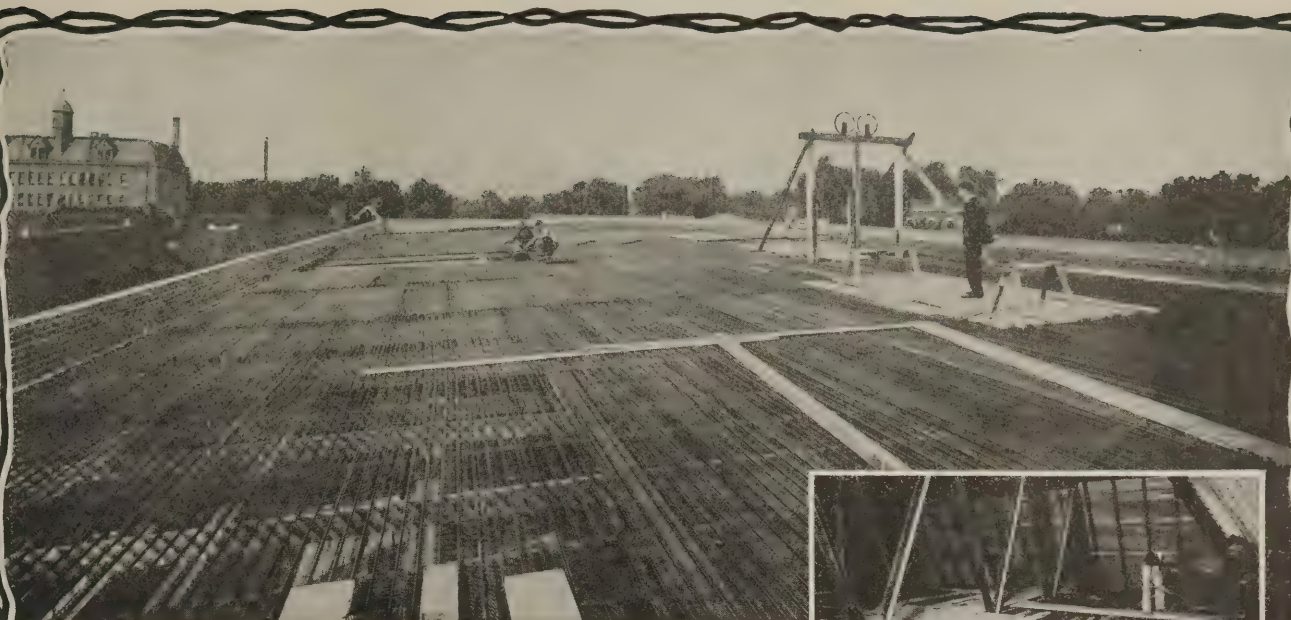
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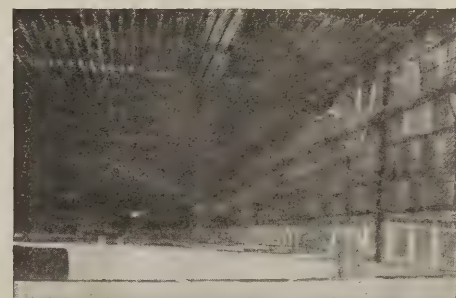
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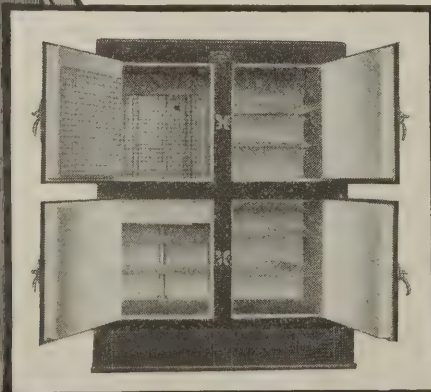
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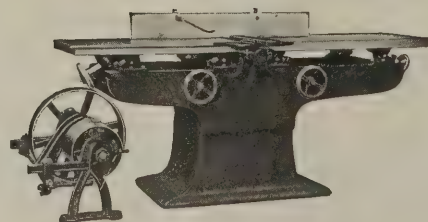
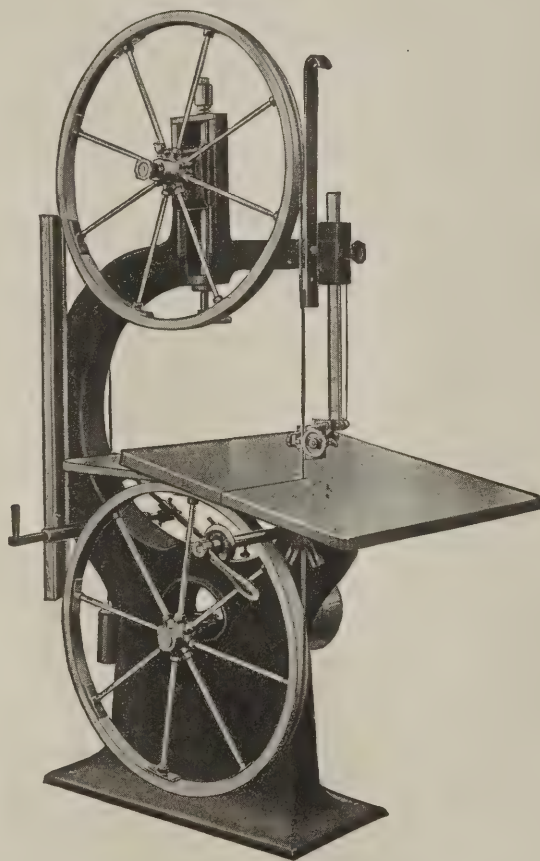
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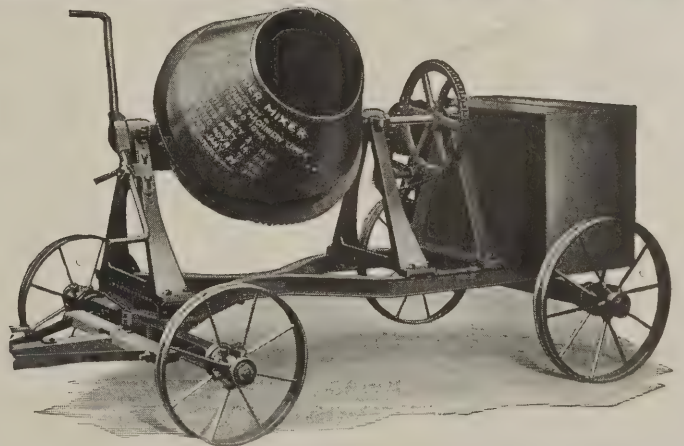
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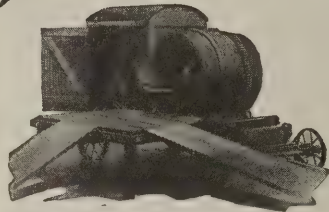
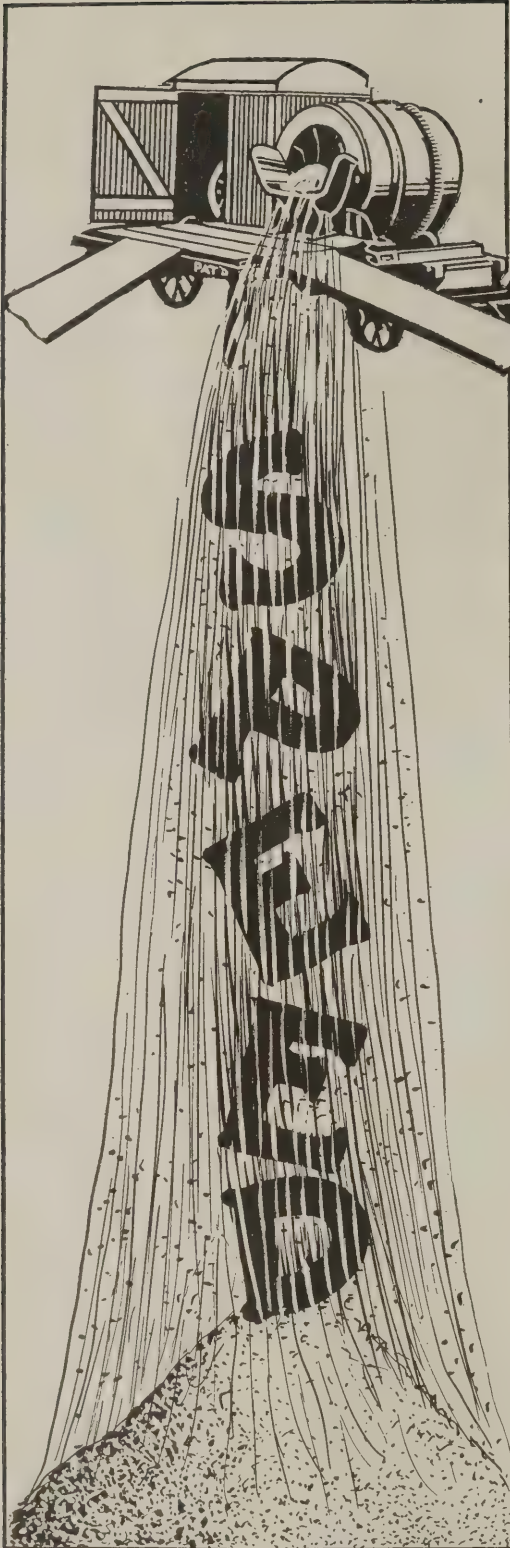
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Start out today to end the high cost of mixing. The first thing to do is to write.

"The Standard" Contractors' Equipment

We manufacture an excellent Portable Variety Woodworker. Twelve tools in one.

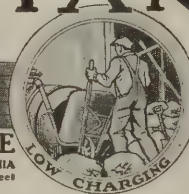
And we can satisfy you if you're in the market for Hoists. Single Drum, Double Drum, Reversible, Non-Reversible. Our Hoist Catalogue shows and explains the various models.

"The Standard" Pump Catalogue will also interest you. Centrifugal, Diaphragm, Trench, Deep Well Outfits, etc.

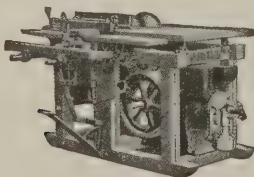
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and Ask for Catalogue No. 32

"THE STANDARD" CONTRACTORS' EQUIPMENT

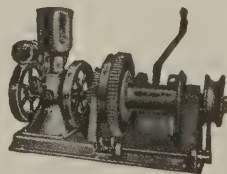
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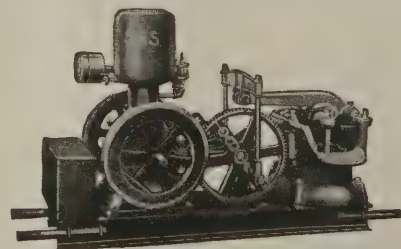
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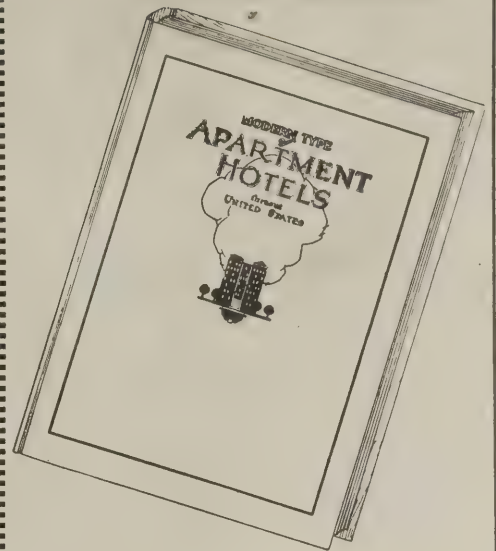
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can build apartment hotels on cheap property as well as expensive. The demand for such accommodations is tremendous.

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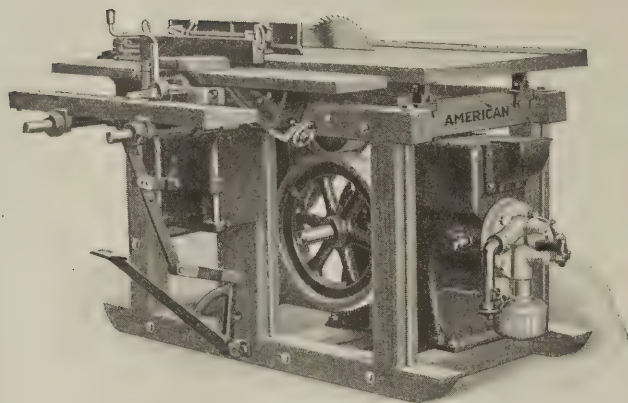
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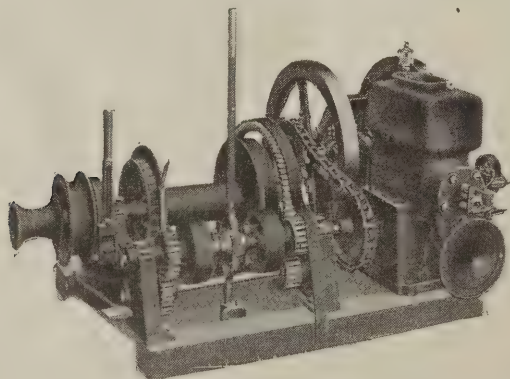
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“American” Variety Woodworker with Gasoline Engine Built In; Also Made with Self-Contained Electric Motor, or for Belt Drive

“AMERICAN” Heavy Rip and Cut-Off Saw

Here's a heavy-duty machine for speed work in large stock up to 10 inches—as in heavy framing and in bridge or dock work. It's a mighty useful substitute for a gang or men. You can have it with built-in gasoline engine or electric motor, or belt driven. Catalog 18 describes it.

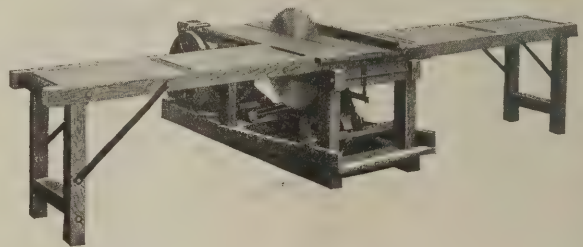


“American” No. 4 Hoist with Self-Contained Gasoline Engine; Also Made with Built-in Electric Motor, or for Belt Drive

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“American” Heavy Combined Rip and Cut-Off Saw. Made With or Without Self-Contained Power

“AMERICAN” Contractor's Hoist

Put one of these high-speed units at your lifting and handling jobs—and watch it cut down time and labor. All-around convenience is the big feature of this hoist, adapting it for quick work. And it has the dependable stand-up-ability that keeps it on the job, working to the limit all the time. Capacity, $\frac{1}{2}$ ton, speed 100 ft. per min., weight 645 lbs., space 32 x 47 inches—isn't this just the size of the hoist you need? Safety has been made a special feature in this “American.” Ask for Bulletin 10.

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Here's barn-building service that's beyond comparison with the ordinary sort. It's different from the usual ready-made barn-plan outfit. STAR Service really begins with the idea for the building. STAR Barns are planned individually to fit the owner's need.

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Recommend STAR Equipment Save Money In Installing

STAR Equipment is easier to install than any other barn equipment. If you install the equipment, here's something that means saving time and labor, which means money: For example, you don't have to hold up cement work when

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This is a 348-page book on practical barns and how to build and equip them. You will find it a big help in your business. If you will send us the names of a few people in your vicinity who expect to build or remodel their barns this year, we shall be glad to send you a free copy. It shows you a great variety of STAR barn-plan suggestions, complete illustrations and floor plans. Shows how to design a modern barn economically, also how to plan the barn to save time and work in daily chores; how to keep it ventilated; in short, how to make the barn the best possible paying investment. And shows everything needed to equip the barn from floor to roof.

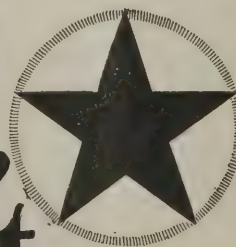
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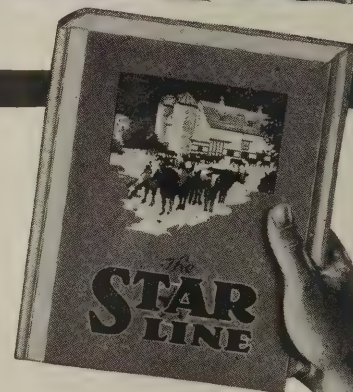
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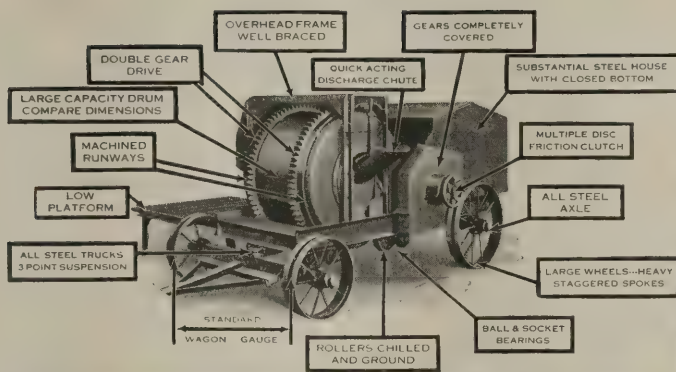
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The Big Value Light Mixer

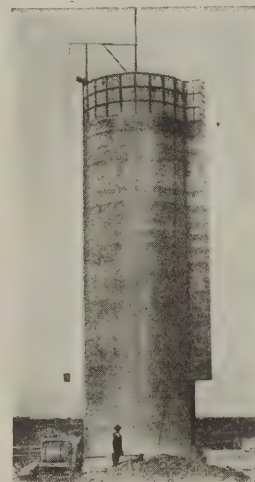
Send back the coupon at the bottom of this page—and get the full facts about the remarkable value of the light mixer field—the light mixer built first for **reliability**, and then built in **volume** to keep the price down.

No, sir, the Dandie is not the cheapest mixer—it is the first light mixer built as strong as a light mixer can be built. It stands up to all the work you can give it—is dependable to stick on the job without costly delays.

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of every part. This is how we get the price down, not by skimping.

Get the Dandie Catalog—get the full details of how volume production has put new reliability into the lighter mixer field—see for yourself why the Dandie is the remarkable value of the industry.



4 cu. ft. and 7 cu. ft. capacities Wet Batch Rating. No. 104-S, gasoline, No. 107-S, steam or gasoline. May be equipped with low charging platform, power charging skip, automatic water-measuring tank and light duty hoist.

The Big Yardage Mixer for Footings, Sidewalks, Silos, Culverts, Etc.

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Please send, without obligation, your Dandie Big Value Catalog....., and advise me where I can see a Dandie Mixer.

Also send me information on items marked X in ☒

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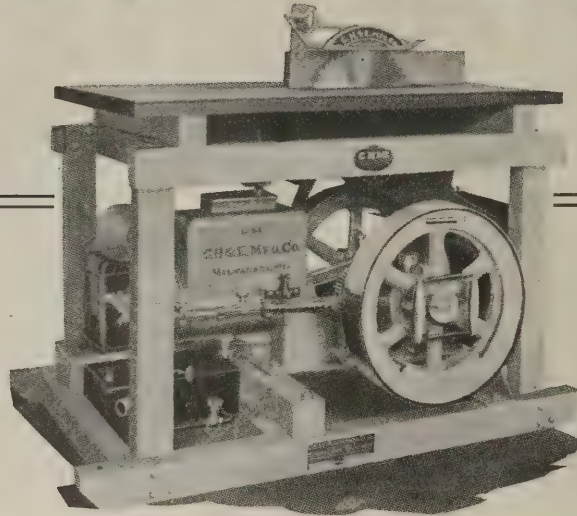
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Saw Rig With 4 h. p.
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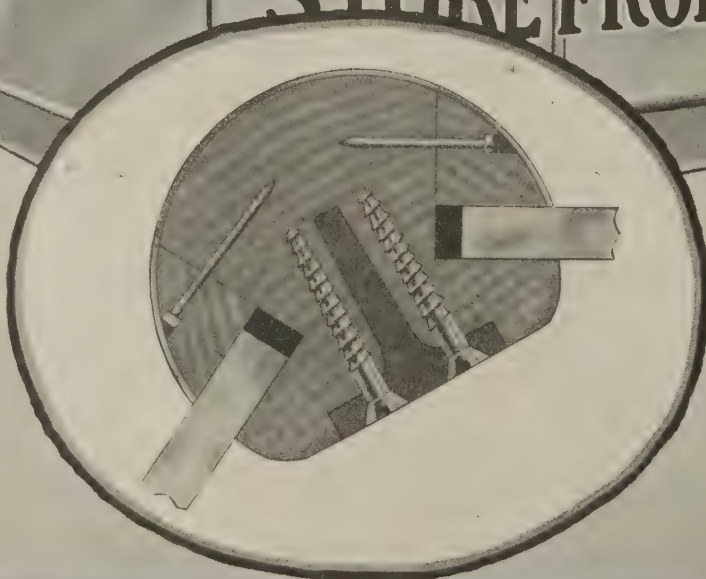
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When you build, your client wants—above all—an attractive, durable store front. He doesn't want to be bothered in the future with windows blowing out or other inconveniences due to an unreliable store front.

Say to him: "I'll put in a Coulson Patented Store Front. Then you'll have a snappy looking building and the glass setting will absolutely hold the plate firmly and safely."

And at the same time you'll be doing yourself a good turn, because Coulson Store Front Construction can be purchased most economically. It's furnished all ready to set in place and can be quickly installed.

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The Most Efficient Rigid Insulation

TESTS made by the United States Bureau of Standards prove that ONE-HALF-Inch Universal Insulite—as an insulator—is 500% more efficient than ordinary wall board and 750% more efficient than ordinary lath and plaster.

That's why it keeps homes comfortable, healthful—warm and dry in winter—cool in summer.

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The only insulating board that will stand outside exposure.

It is equally effective as a Plaster Base, as a Sheathing, as a Wallboard, as a base for Magnesite Stucco. It is proving its insulating value in homes, garages, schools, refrigerators, refrigerator cars, ice houses, warehouses, fruit cellars, cold air ducts, incubators, etc.

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The fibres are specially treated to make them impervious to moisture. It has no capillary attraction. Prevents dampness.

Made from selected long wood fibres only. Clean, odorless, vermin-proof. Comes in even, uniform sheets, 32x48 inches wide, 8 to 10 feet long— $\frac{1}{4}$ and $\frac{1}{2}$ inch in thickness. Handled and applied like lumber.

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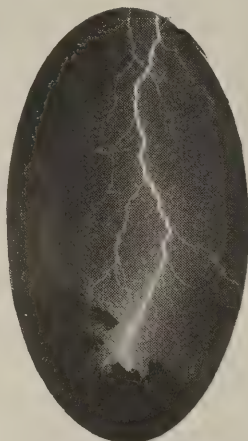
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Lightning is the result of attraction between electrical energy in the cloud and electrical energy in the earth, finally overcoming the resistance of the dry air between. If there is a house just below the cloud, the attraction of the electricity in the cloud, drawing upward on the electricity in the earth, tends to literally

"charge" the house with electricity. Therefore, if the electric force should at that moment break through the air, the building, being directly in line and heavily charged with electricity, would probably be destroyed.

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Prevents Lightning Losses

Shinn-Flat prevents the accumulation of electricity in the building, by permitting it to gradually pass from the heavily charged ground into the atmosphere above the building—relieving the strain on the building caused by the attraction of the electricity in the cloud above, and removing the conditions that cause the Lightning Stroke.

36% Greater Protection Against Lightning

Shinn-Flat is the only Lightning Rod made in the form of a flat cable—and is much more efficient. Has 36% more conducting surface for electricity than the same amount of material made into a round cable.

WE HELP YOU GET THE BUSINESS
We teach you how to protect any building and how to get the business.
Write for information.

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Feeling Proud of Your Work

Not one builder in a hundred likes to put up cheap, flimsy buildings and you are no different than the rest, in that respect.

Of course, you usually put on the kind of roofing that is specified, but there are many cases where you can recommend slate.

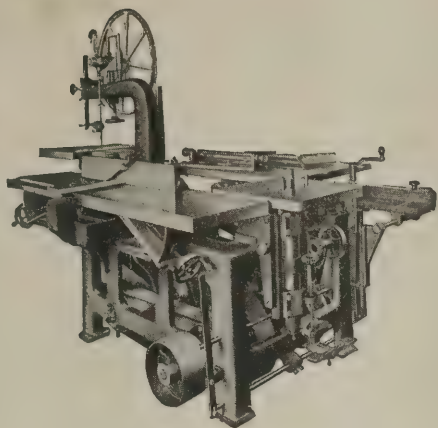
That is the roofing you can feel proud of as long as you live, because it will outlast the building and require little, if any, repairs. It is fireproof and most economical.

Prompt shipment from our forty quarries' average stock of 150,000 squares.



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Largest Shippers of Roofing Slate in the World
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WOODWORKER

40%

increase
in
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By reducing time-loss to a minimum, Famous Universal Woodworkers increase output 40 per cent. Actual performance tests have proved this.

Five men can work at the Famous without interfering with each other—a feature that is impossible on any other machine. This means a great saving of time, inasmuch as your men do not have to wait for their turn at the machine, but can use it when they need it.

All the woodworking-needs of the contractor or builder are combined in these truly "universal" machines—so compactly designed and constructed as to enable him to profitably take it on any job.

Their quality and workmanship set a standard—reaching the peak of exclusive excellence. It is

our guarantee that they are superior machines. Forty Hundred of our Famous Woodworkers are saving time and solving the labor shortage problem of contractors and builders all over the country.

And they are ready to do the same for you.

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the complete
story of Uni-
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workers.


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GUARANTEED
GRADING. YES.



RECONSTRUCTION
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"EVERY STICK IDENTIFIED."

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Make Extra Money on Concrete Work

BID ON THE WHOLE JOB

Why be satisfied with part of the job? There's a lot of extra profit in Foundations, Walks, Floors, Walls, etc., to be made by any carpenter-builder equipped with a **SHELDON BATCH MIXER**. It's compact, easy to move, sturdy and efficient—will work one man or six. Does all ordinary jobs cheaply and makes a profit where no other will. Mixes mortar and plaster, too, if you wish. Here's the biggest little helper to extra profits you ever saw, and at a price that any carpenter can afford to pay.

Sheldon Concrete Mixers \$25.50 UP
Save Time, Save Labor, Save Money

Sheldon Mixers are rapidly taking the place of big, costly-to-buy, expensive-to-run, large capacity mixers—because they do the work of a \$200 or \$300 mixer and cost much less to buy and use. Many contractors who own large-capacity mixers have bought several Sheldon mixers to use for all ordinary work, from putting in foundations to building a bank, and all say the Sheldon is a work-eating, money-saving mixer. Read what Sheldon owners say in our catalog.

GET STILL BIGGER PROFITS ON YOUR CONTRACTS

This year will see the biggest building activity this country has ever known. Get into the concrete game at once if you're not in it now. Get still bigger profits if you are already in it. You can "clean up" with the help of a Sheldon Mixer.

There is a Sheldon Mixer to fit every man's requirements—from the hand mixer on strong wooden frame to the No. 8 X power mixer on steel wheel trucks. The Sheldon Power Mixer No. 6 X (shown above) is mounted on strong, well-made skids and is a favorite with contractors because it can be easily loaded and carried on an auto truck, or sledged from place to place on the job. It is equipped with a 2 H. P. Stover Engine and Webster Oscillating Magneto and at \$107.65 it is the lowest priced fully equipped mixer to be had today. The most popular Sheldon Mixer No. 4 (shown herewith) is a work-eating, money-making mixer—built

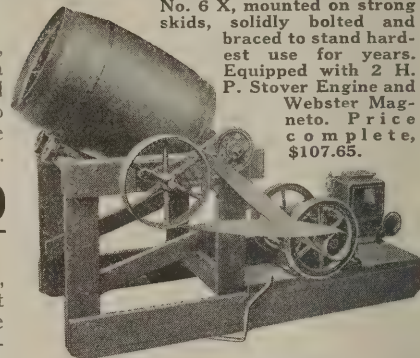
to stand the rough and tumble treatment that a concrete mixer always gets. The mixing drum is removable and the whole machine fits nicely in a regular wagon box—no expense, no lost time, or trouble in moving it from one job to another. All Sheldon Mixers have 3 cubic feet capacity or two wheelbarrows to the batch. The steel paddles inside the mixer drum are so placed that the concrete is **THOROUGHLY MIXED**, no matter what proportions you are using. No other mixer excels its quality of work—no other mixer approaches its wonderfully low price.

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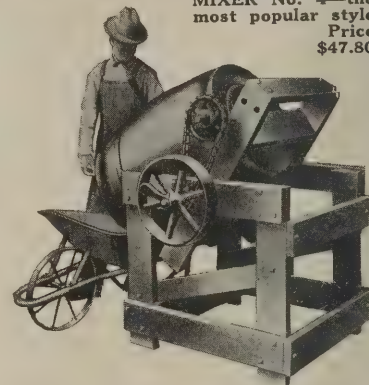
fully illustrated in colors, showing every possible combination and quoting all prices—there's a price to fit every purse, and a trial privilege offer that puts it right up to you. Write today and you'll have time to get your mixer for the busy spring work.

Sheldon Manufacturing Co., Box 3058, Nehawka, Neb.

SHELDON POWER MIXER No. 6 X, mounted on strong skids, solidly bolted and braced to stand hardest use for years. Equipped with 2 H. P. Stover Engine and Webster Magneto. Price complete, \$107.65.



SHELDON POWER MIXER No. 4—the most popular style. Price \$47.80.



Winthrop Tapered Asphalt Shingles

Only Kind Tapered Like Wood

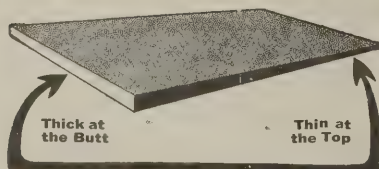


It is Really a Shingle

The Winthrop Tapered Asphalt Shingle is the only asphalt shingle made that is really a shingle. It is thick at the butt and thin at the top, and lays and looks just like a shingle roof. As a result, in 10 years it has become the most popular asphalt shingle in America. Just as an illustration, in one city more than 1,000 residences are Winthrop-shingled.

Quick and Easy to Lay

A quick, easy job for the men. The completed roof costs no more than dipped shingles and is twice as serviceable. Winthrop Tapered Asphalt Shingles are used and recommended by hundreds of contractors. Made in three colors, red, green and slate black. Beautiful color effects are possible.



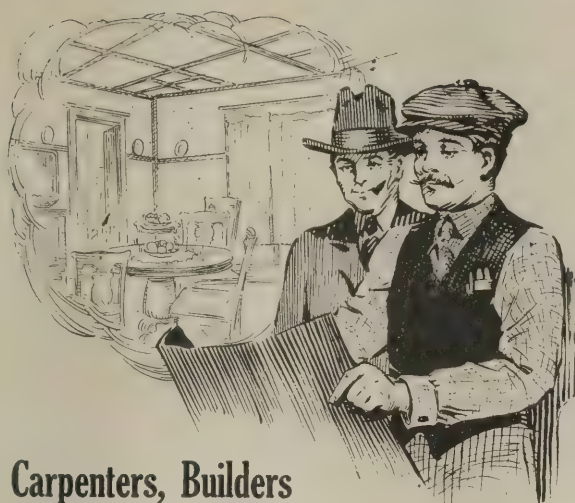
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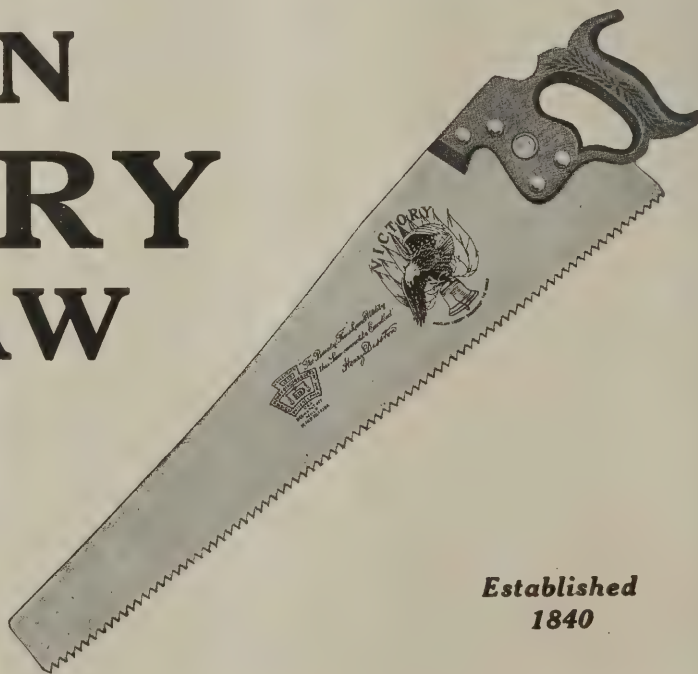
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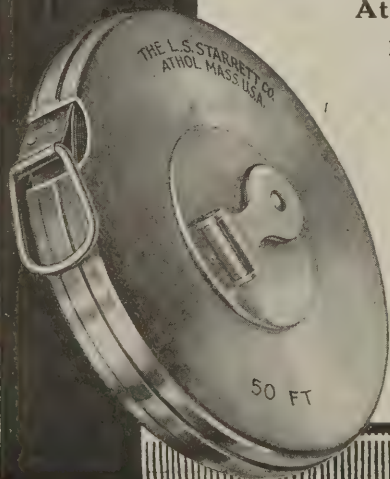
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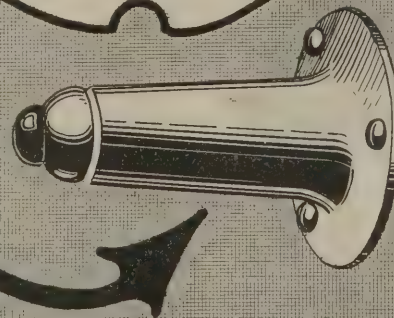
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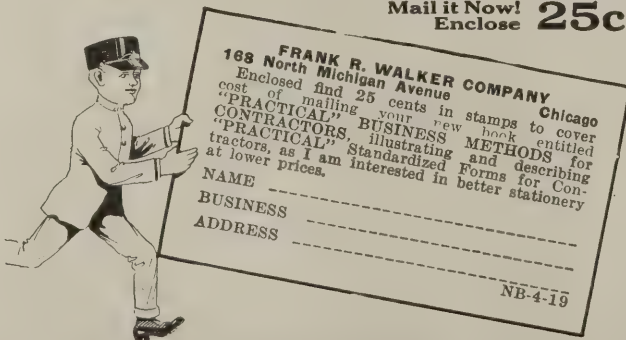
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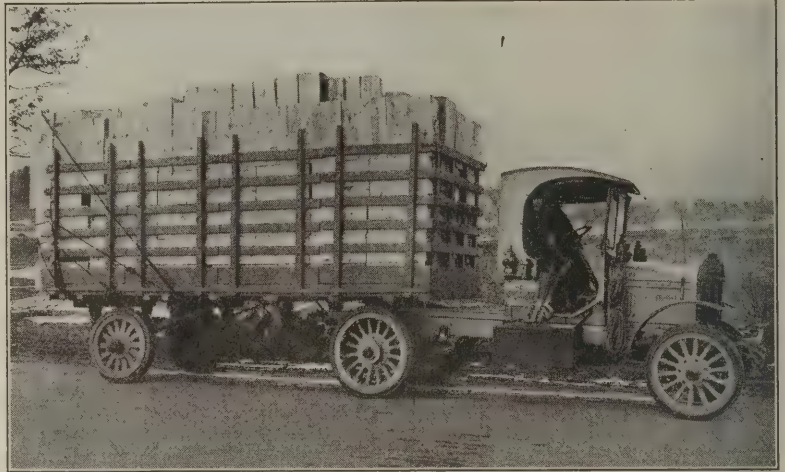
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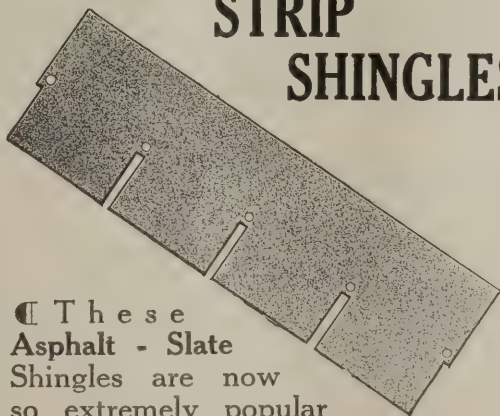


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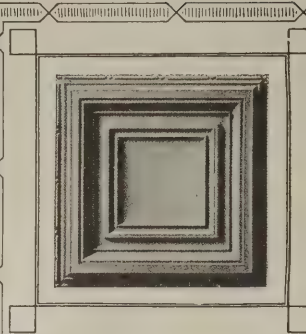


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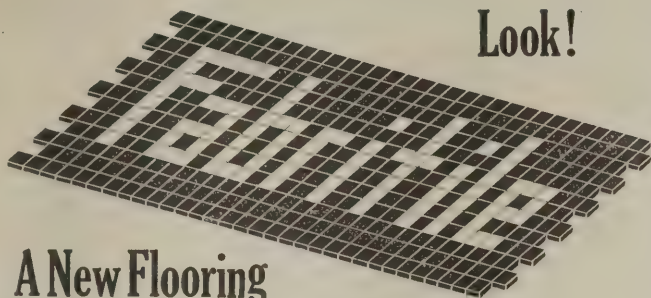
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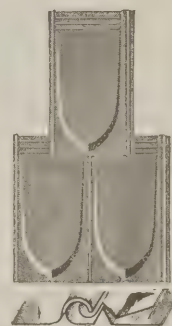
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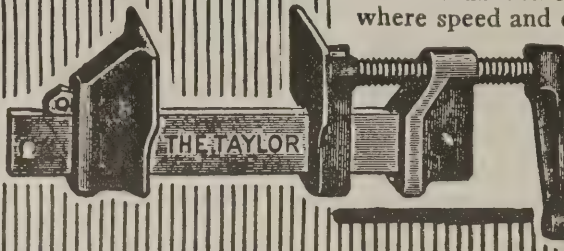
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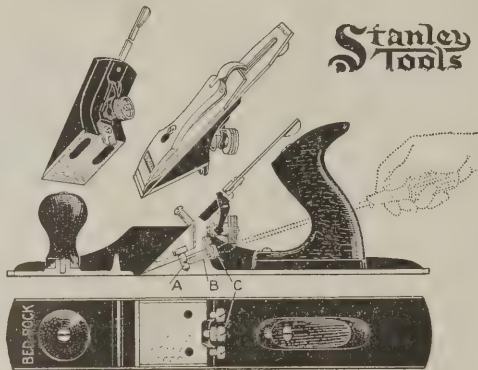


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THE JAMES SWAN CO.
Established 1810 Seymour, Conn.



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Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction. Doesn't matter how hard the wood is, no consequence whether it

is full of knots, or the grain awkward to negotiate.

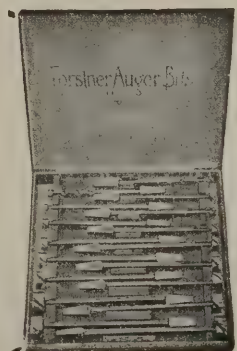
The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

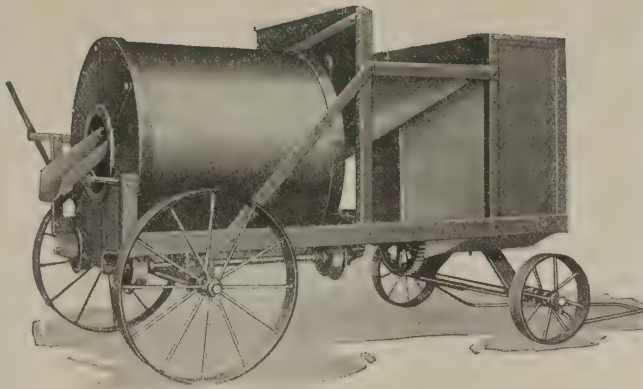
Unequaled For Delicate Work

Supersedes chisels, gauges, scroll-saws, or lath tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do

more work than other bits and cost no more. We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

THE PROGRESSIVE MFG. CO., - Torrington, Conn.





BOLTE BATCH AND CONTINUOUS MIXERS

Bolte Mixers have been made since the concrete mixers were invented. We are one of the pioneers. During the years Bolte Mixers have been on the market, thousands have been distributed all over the United States. And today nothing but good is spoken of them.

Bolte Mixers have four actual features that will strongly appeal to you: Capacity—Portability—Simplicity—Durability.

Our literature illustrates and explains both "Bolte" and "Handy" Mixers. Ask and we will send it immediately

THE BOLTE MFG. CO.
KEARNEY, NEBRASKA

Don't Carry Dead Weight in Your Tool Chest



EVERY pound counts when you move your kit. Make every tool count. Quality tools do more work, do better work, and last long.

D. R. Barton Tools

earn their space in every kit. They hold their edge, require little sharpening, and are always reliable. The Mack process of tool hardening gives temper without brittleness.

The cut shows how far D. R. Barton tools can be sharpened. Serviceable after years of use.

Write for "True Stories," which was written by users of D. R. Barton Tools. Write today.

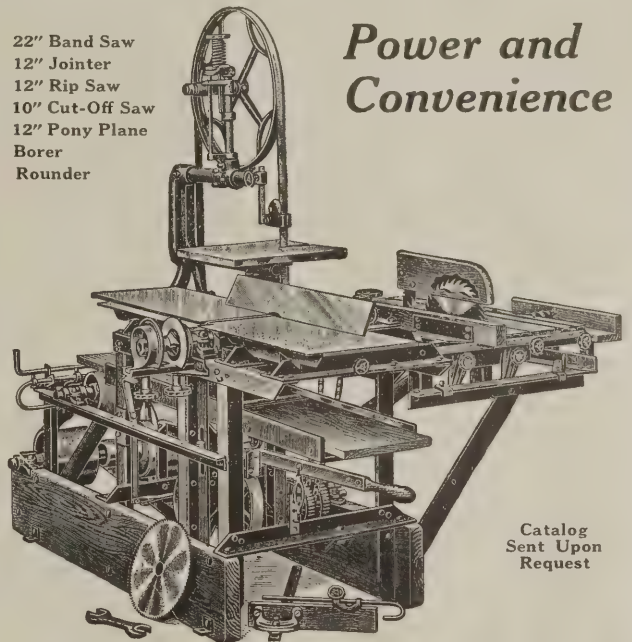
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22" Band Saw
12" Jointer
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is simple and easy to operate and is guaranteed to do good work.

The Parks Ball Bearing Machine Co.

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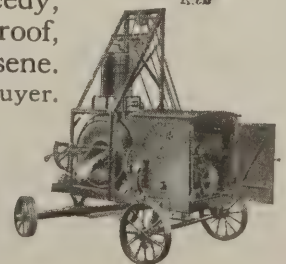
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Simple design and sturdy construction mean years of dependable, trouble-free service. Unequalled for speedy, thorough, economical mixing. Engine is frost-proof, fool-proof and durable. Burns gasoline or kerosene.

Fuel bills cut to the minimum. Price and performance will please every buyer.

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Our new foot and hand power Circular Saw No. 4 is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

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Solid Iron Table
Planed Perfectly
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III. With Universal
Mitre Gauge

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Huther Heads Do Good Work



because they are designed and built to handle your grooving, matching and moulding, right. Huther Dado and Cutter Heads fit on any saw mandrel, and are used wherever power woodworking machinery is operated.



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Grooves Cut with Huther Bros. Dado Heads

Is your shop fully equipped? You can try out a Huther Head at our expense. In this way you can decide for yourself that you need Huther Heads in your shop.

Let us send you a Dado Head or Cutter for trial in your shop.

Write for catalogue and prices.

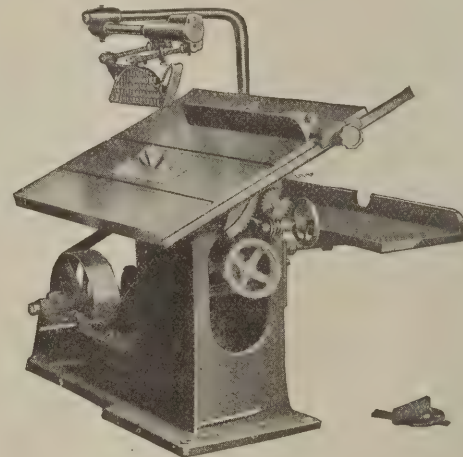
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Huther Bros. Saw Mfg. Co.
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is built for continuous, exacting service and always meets the requirements of those particular users who want the best.



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is the only wall board made with a center core of kiln-dried wood slats. Not a pressed imitation wood, but nature's own product in its most usable form.

It saves time in construction—proves more satisfactory. It keeps out cold, heat and moisture, does not chip or mar from knocks. Won't buckle, shrink or crack.

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Economy Chemical Closet

The world's best. A sanitary indoor closet which can be set up in the best room in the house—positively kills all germs and odors. It does away with the outdoor privy, and the NU-WAY gives comfort and convenience where there are no sewer connections.

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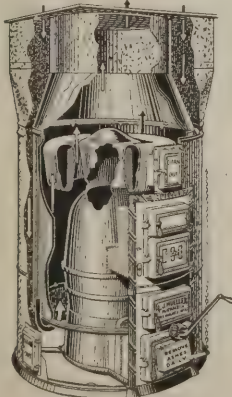
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The Mueller Pipeless Furnace has proved its efficiency, economy and absolute reliability in thousands of homes in the coldest parts of the United States.

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Kinds Since 1857

Sanitary Chemical Toilets



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—No Germs
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A Modern Convenience — A Real Necessity

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Make Big Money Representing Us**

Sales Easily Made. Profits Liberal. You sell the first one. It will sell the rest. Every home without sewer connection needs one.

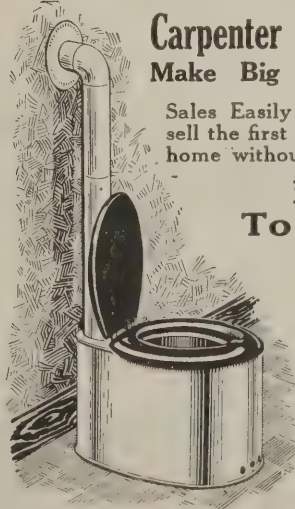
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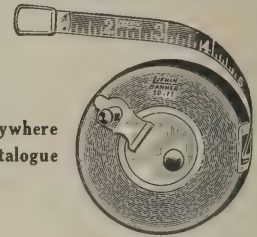
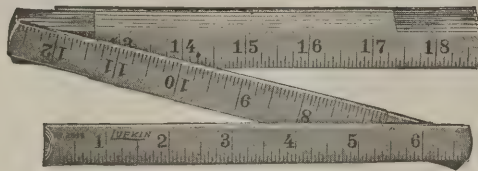
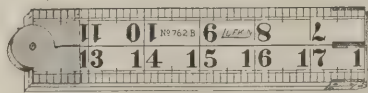
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Spring Joint and
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On Sale Everywhere
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All up to the high quality standard, which, for years, the name has implied

DIAMOND Expansion Bolts



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Quality exists to some degree in most expansion bolts.

Distinctive Quality is what has caused the "Diamond N" to be the most copied expansion bolt ever produced.

Examine them and you will find some of the Diamond distinctive features in all, but you will find all in none but the original.



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Lumber and Millwork

For Immediate Shipment
Out of St. Louis

Avoid Delay and Trouble

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Sand's Aluminum Levels

Always Tell the Truth

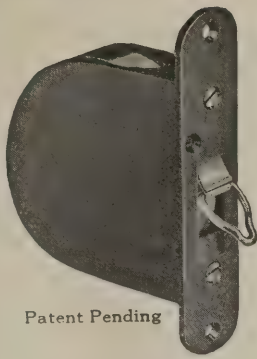
The standard of accuracy. And not only the most accurate—but the easiest to read, even in the dark. Never rusts—cannot warp, split or crack—and are easily handled.

The lightest levels made—strong and durable because the greatest strength is placed where most needed. Ask your dealer to show you these levels, and also write for our new catalog.

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For use in all classes of new work
Box frames unnecessary. Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

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NICHOLAS HARDWARE CO.

Wholesale Builders' Hardware

Successors to

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The most complete builders' hardware stock
in the middle West

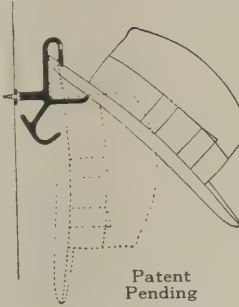
Many special prices on finishing hardware

150 genuine bronze cylinder front door sets
complete at \$6.75 each

Send in your lists for prices

Ask for Catalog
No. 6

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We have designed it to be of practical value and it possesses satisfying features. Will hold any stiff hat safely, cannot puncture delicate garments if hung over inverted "U," and has a projection for holding razor strops or umbrellas.

The castings are nicely japanned and are shipped in cartons of one dozen. Send today \$1.00 for trial dozen. Wholesale prices on request.

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Tear out this ad and write at your convenience

The Great Diehl Line of Hardware Specialties

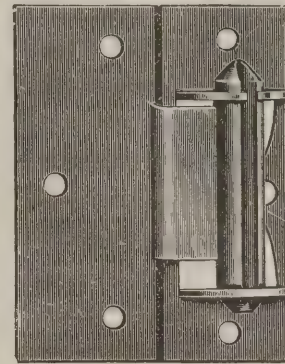
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Storm Door
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Co.

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Hinges
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Base Knobs
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Our line of tools includes Gauges, Plane Irons, Chisels, Drawing Knives, Nail Sets, Screw Driver Bits, Carving Tools, etc. Our reputation guarantees them all. Catalog shows them all. Write for it.

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Stronger than any wooden chest, much lighter, holds tools better, much easier to carry. Same shape as a suitcase when folded and carried like one.

Made of 3-ply veneer, covered with heavy canvas and painted. Edges and corners are bound and reinforced with steel. Two brass catches and locks. Contains a place for every tool. Two sizes—31 in. for 26 in. saws, 33 in. for 28 in. saws. Will last a lifetime. Write for booklet and prices now.

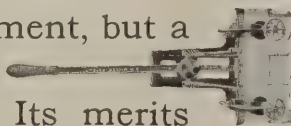
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THE MILLER LOCK MORTISER

*Two Minutes' Time Does the Job and
Two Days' Work Pays for the Tool*

Not an experiment, but a practical up to date device. Its merits fully proven.



A. W. MILLER MFG. CO.
RIVERSIDE, CALIFORNIA or CINCINNATI, OHIO
Our Butt Mortiser sent for 60 cents

SYRACUSE Means Good Nail Sets



The experienced carpenter selects nail sets by the "feel," the grip on the nail, and the durability. Generally he chooses the "Syracuse" because experience shows it to meet his needs best.

2/32 in. to 5/32 in., 12 cents each; square "No-Roll" Sets, same sizes, 15 cents each. Sent postpaid.

Syracuse Twist Drill Co.
Syracuse, New York

PEARSON'S Automatic Shingle NAILER

Sent
Right to
Your
Door by
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for
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Pays for Itself on the First Job
Very Fast on Any Pitch Roof
For 3d Common or Galvanized
Wire Nails

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Pearson Manufacturing Co.

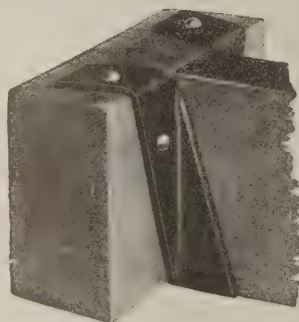
Makers of Hand Nailing and Tacking Tools

\$6

Robbinsdale,

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Showing the sizes of joists,
safe loads of joists, actual
loads on hangers—practical,
valuable. We also
send mounted model of

Lane Joist Hangers

See what builders and archi-
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The W. J. Clark Co.

Salem, Ohio, U. S. A.

Dahlquist Copper Boilers

are used in homes, hotels and institutions.
Ours is the largest factory in the United
States producing copper tanks.

We build copper tanks and boilers for pres-
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Samson Spot Sash Cord

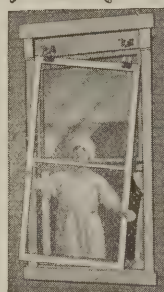
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Send for free samples, prices, etc.
We also make solid masons' lines,
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Keeps money saving devices for carpenters and builders

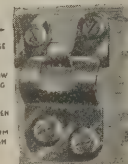


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will please your trade

because even a woman can easi-
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hinges. Larger hanger opening
and guide flange take the back-
breaking strain out of the job.
They slip on easily. Show them.

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DIETZGEN Instanto Ink Remover

removes Waterproof Black Drawing Ink from tracing
cloth in an instant—cleanly and effectively. The ingredi-
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50c will bring trial bottle prepaid. Con-
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FULL LINE OF PLUMBING, HEATING AND PNEUMATIC WATERWORKS SUPPLIES

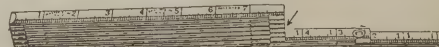
Sold Direct at
Wholesale Prices
20% to 40% Saving

Complete bathroom outfits, tubs, closets, lavatories,
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Prompt shipment from a complete stock. The only house
selling up-to-date, guaranteed goods at wholesale prices.
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The famous "Interlox" Master Slide Rule gives
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Quick, accurate, no figuring, no mistakes. Durable
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All sizes 2 ft. to 8 ft.—20 cents per foot.

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wood gives such long and
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WHITE PINE

RED GUM

*"THE LOVELIEST CABINET WOOD
IN ALL THE WORLD."*

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**Puts the "Skids" under Every Disease
Germ in Floors. Antiseptic and Lasting**

It kills germs and odors. Makes floors waterproof, adds to life, stops bulging and shrinking. Protects against the action of oils, alkalies and dilute acids. Disinfects floor dust and keeps it down. Durable and economical.

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TRADE
MARK **NICE**

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**Varnishes
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are quality products through and through

"Nice" Trokal
Liquid Filler Floor Finish
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White Enamel *For Cement, Concrete, Etc.*

These are but five of our highly specialized products that will interest you. Write for catalog and price list.

Eugene E. Nice, Philadelphia, Pa.

**FOR SPRING BUILDING (OR
REPAIRING) USE & INSIST ON**

TRADE-MARK "TIDE-WATER"

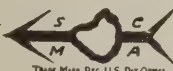
CYPRESS

**LUMBER--BECAUSE IT'S "THE
GENUINE WOOD ETERNAL."**

& LASTS & LASTS & LASTS & LASTS

Look for this on every board—

Accept no Cypress without this mark.



COLONIAL

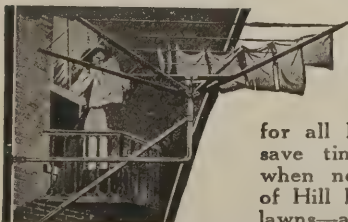
Fireplace Furnishings

When installing a grate be sure that it is a Colonial. If it is it will be tasty, original and reliable.

It is equally important that the equipment—grates, dampers, ashtraps, and so forth—are also Colonial Brand. They insure service and beauty in keeping with the hearth's design.

Colonial Fireplace Co.
Chicago, Illinois

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**HILL
CLOTHES
DRYERS**

for all kinds of houses. They save time and labor—fold up when not in use. Get details of Hill Dryer for balconies and lawns—also our Cabinet Clothes

Dryer for laundry rooms of residences, apartments and institutions. The Hustler Ash Sifter is another convenience for the home. Send postal for Catalog N.

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**Increases the Renting and Selling Value
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Write for Our Catalog Showing Many New Designs

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Build
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Cut out big profits. Anyone handy with tools can make a cabinet according to our drawings and simple instructions. We furnish mechanical parts at small cost. Drawings, blue prints, parts price list, etc., free on request. Write today.

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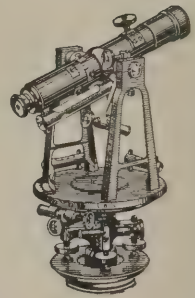
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Beckmann Building Instruments have the full confidence of all who know them.

They are dependable. In accuracy, precision, convenience, serviceability, they are "the last word."

Have you the new Beckmann catalog?

The L. Beckmann Company
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The IMPROVED Rapid Floor Surfer



will surface right up to the wall or baseboard without the use of edge-roller.

Just the machine you would want for surfacing all kinds of wood floors, whether old or new. Will smooth down rapidly and easily all joints or warped edges. Perfect results guaranteed. More than 20,000 in use.

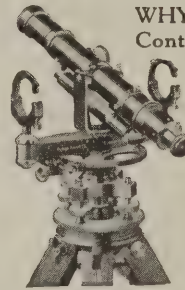
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It Will Pay You to Find Out

WHY progressive and successful Builders and Contractors after a comparative test invariably select the



"STERLING" Convertible Level

Ask the man who owns one or write us for Illustrated Pamphlet D and details of our Free Trial Offer. Easy Payment Plan.

Direct from maker to user—one profit—biggest value! Correspondence invited.

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Make Money

By surfacing your floors the "American Universal Way."

Make floor surfacing a desirable and profitable work. Machine is electrically driven—

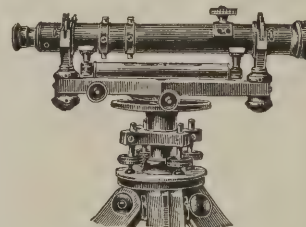
Saves Time, Saves Money, Does Better Work

The American Floor Surfacing Machine Co.

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TOLEDO OHIO

"The oldest concern in the business"



KOLESCH DUMPY LEVELS

are absolutely
dependable

It will pay you to use one and be sure your work is level. Light in weight, but built for hard service and to last. Accuracy unquestioned.

Sold at a reasonable price

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The Wayvell Chappell Automatic Ball Bearing Electric Floor Surfacing Machine

is what you need to finish your new or old wood floors quickly and just the way you want them.

Patented roller eliminates vibration also reaches all baseboards doing away with unsatisfactory work of narrow edge roller. Four sizes—for the largest areas or the smallest rooms. Built to last.

The Little Automatic Electric Surfacing Machine (on desk) is a wonder for removing varnish from desk tops, counters, etc., or for new work. Write for folders. Accept our free trial offer.

Manufactured by

Wayvell Chappell & Co.

356 W. Madison St.
Chicago, Ill.



Pat. 1912-1916



Pat. 1916

Sold On Its Merit

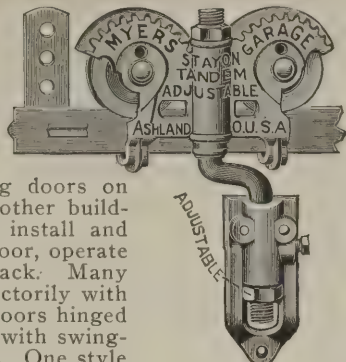
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Write for catalog, prices, etc. Made in five sizes.



Fox Supply Company, 115 Main Street, Brooklyn, Wis.

MYERS GARAGE DOOR HANGERS



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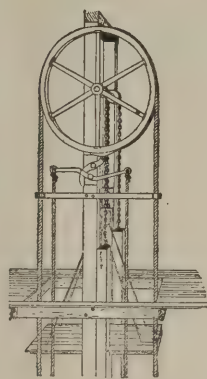
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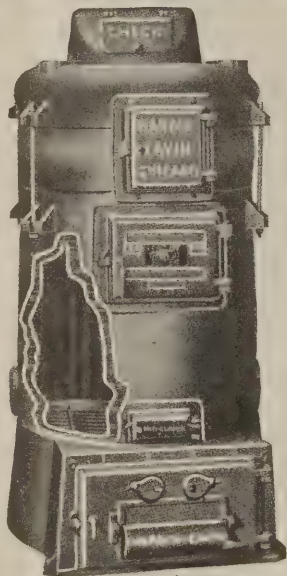
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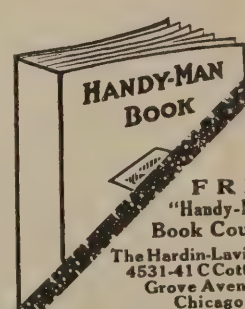
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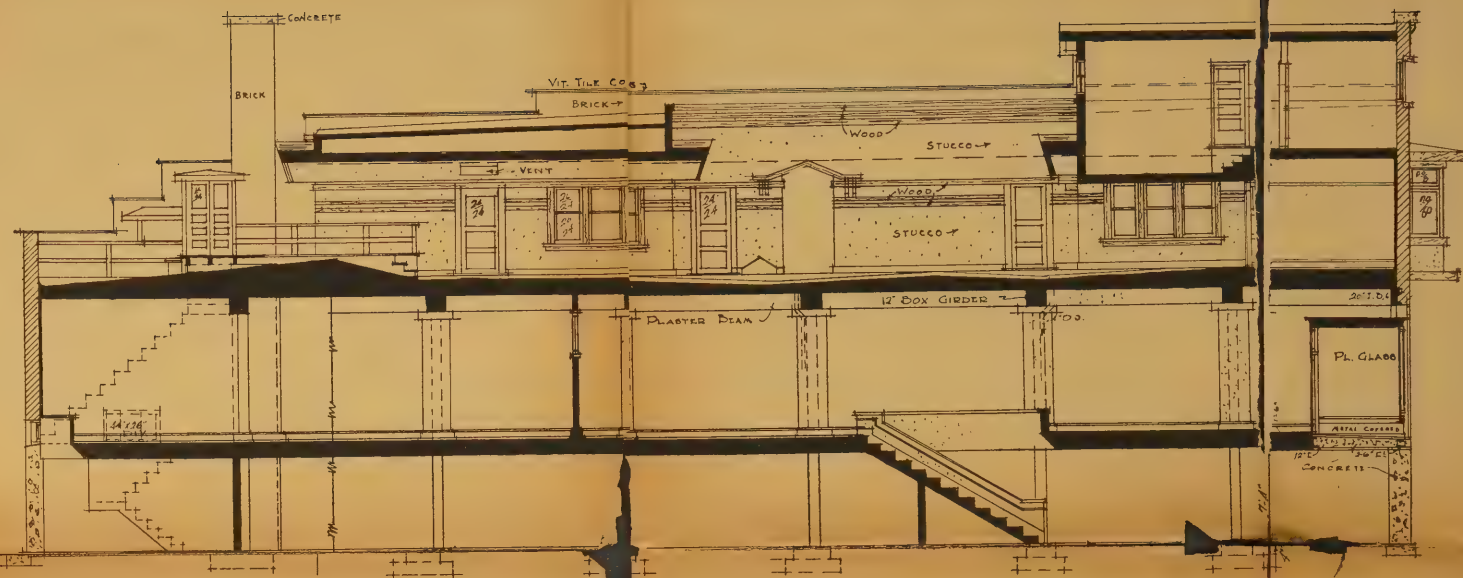
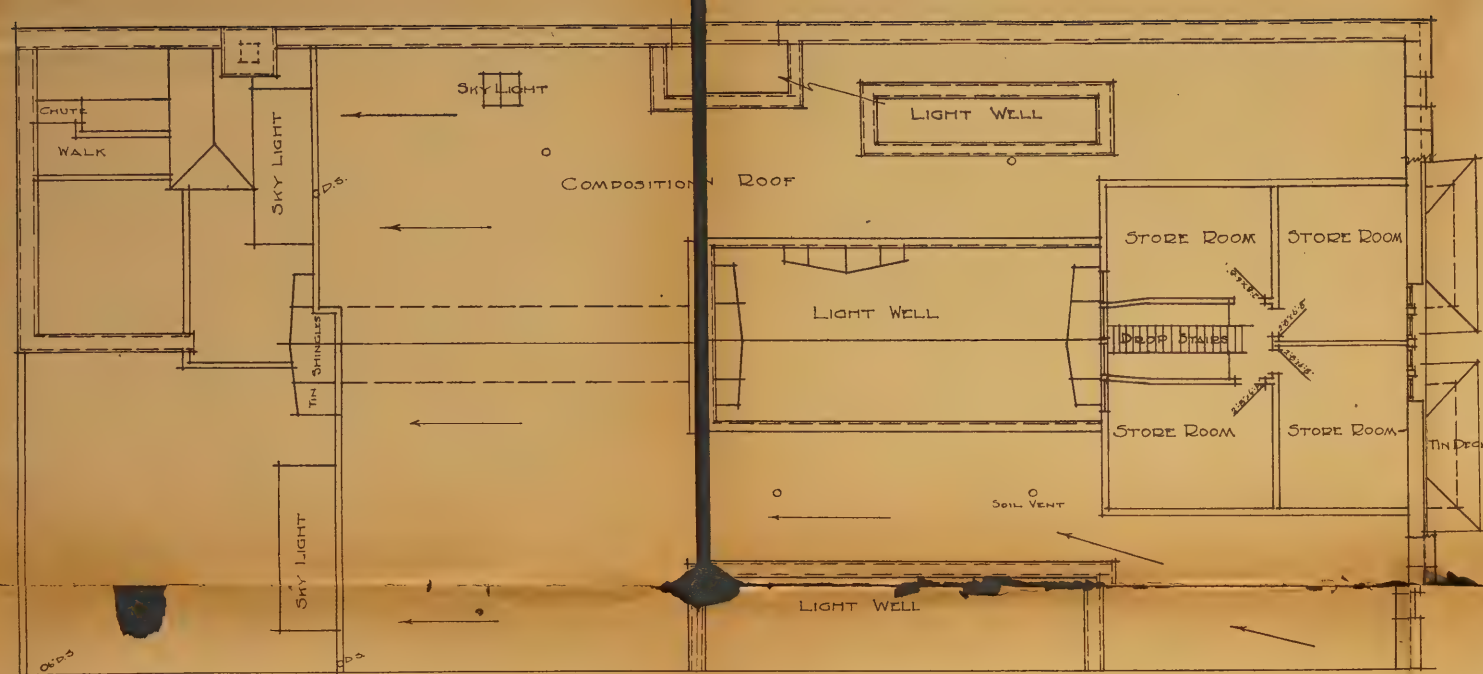


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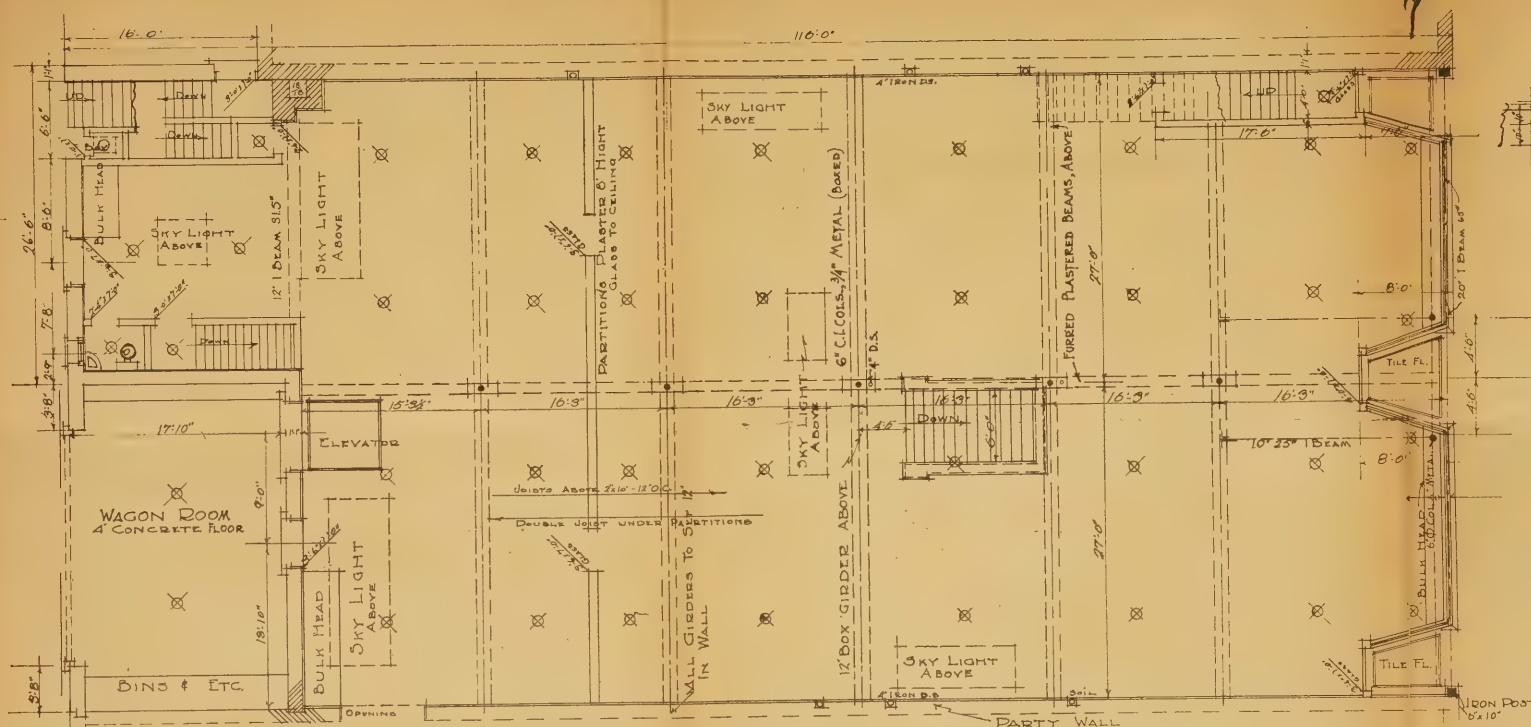
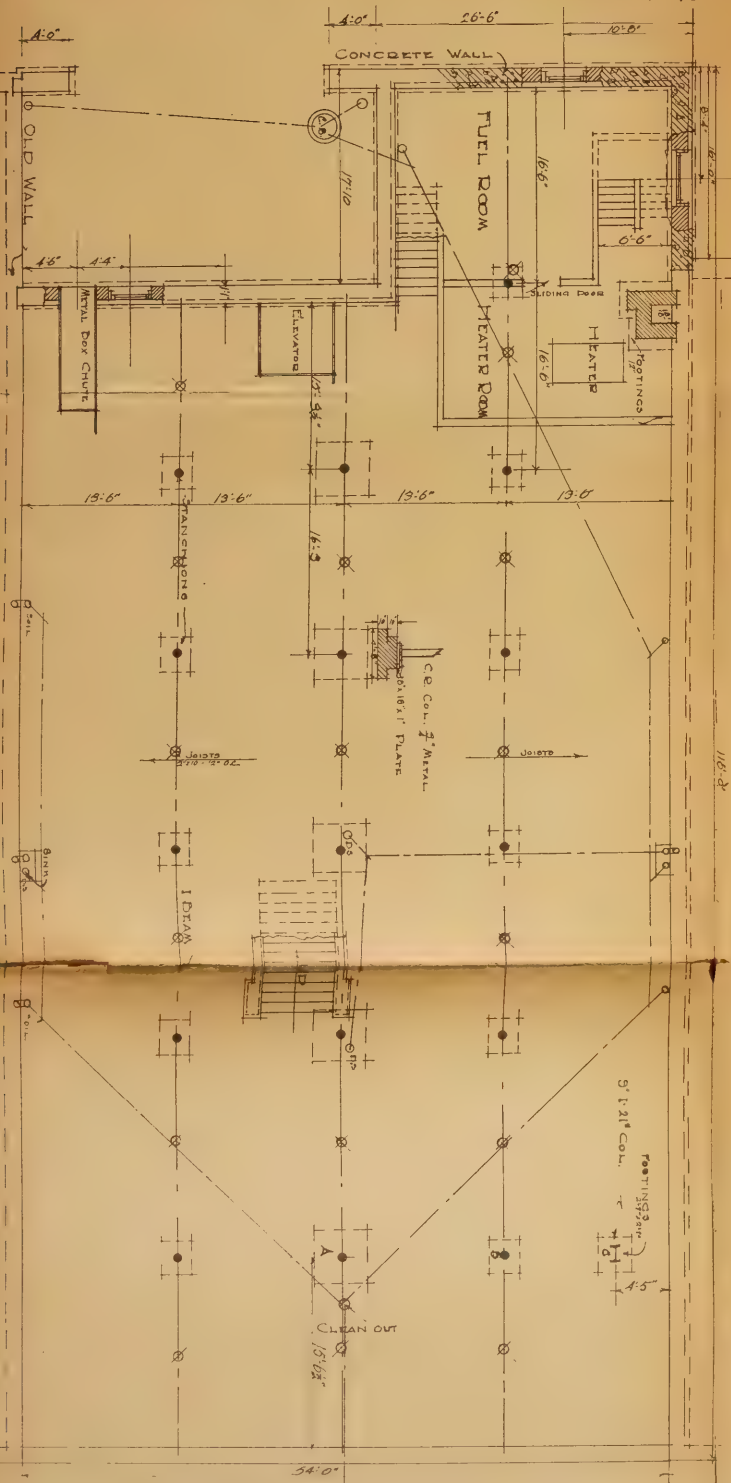
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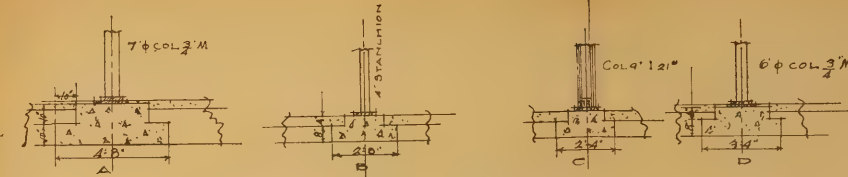


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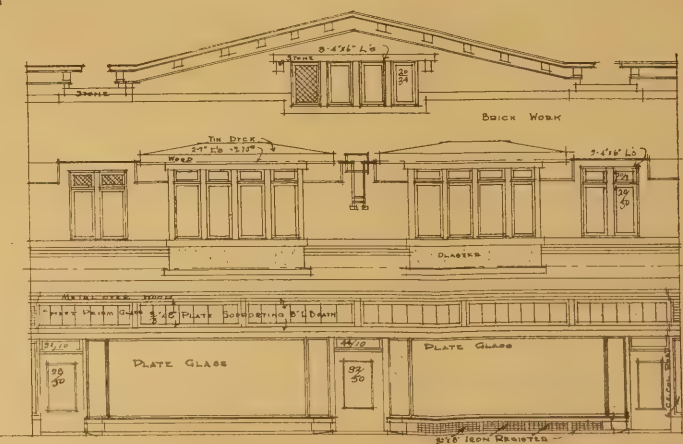


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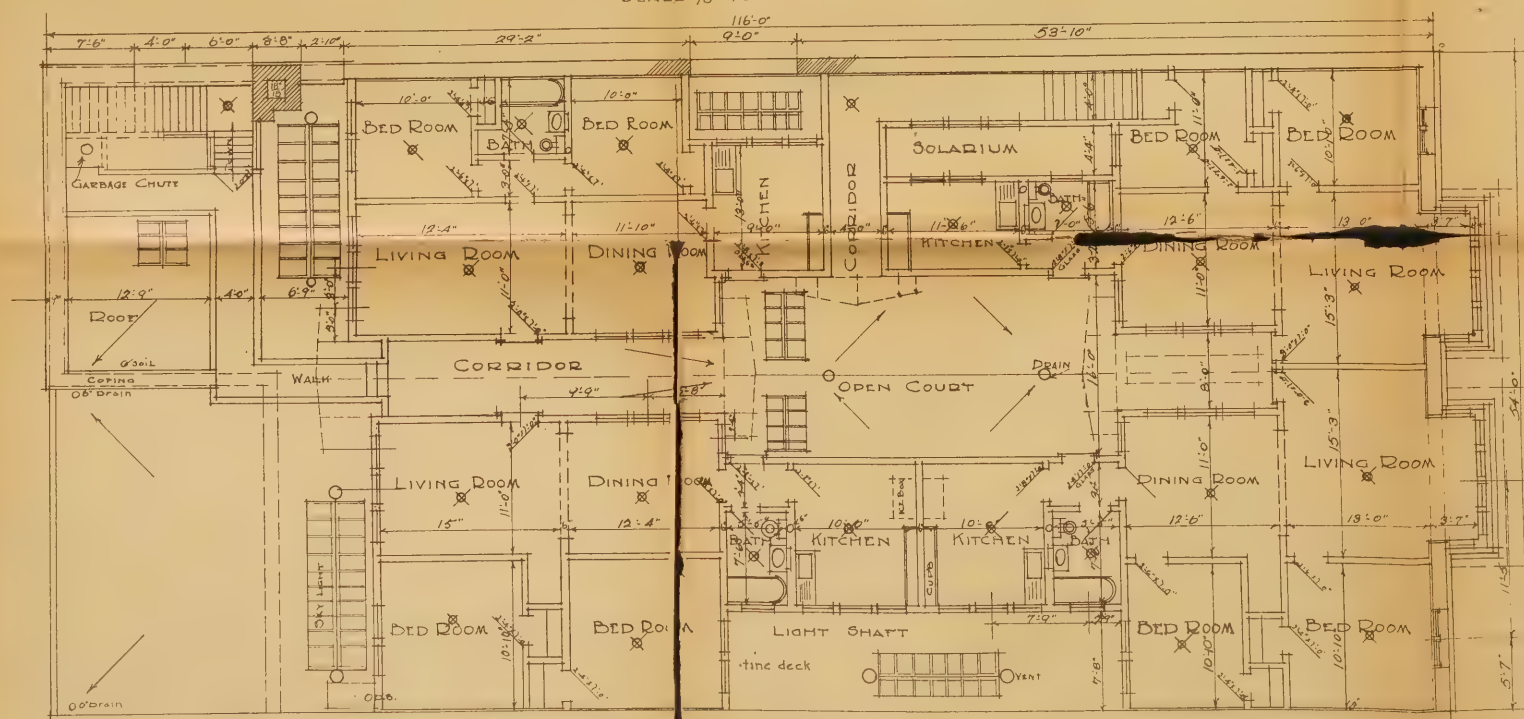


DETAILS OF FOOTINGS
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120.5' *big beam*
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FRONT ELEVATION
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SECOND FLOOR PLAN
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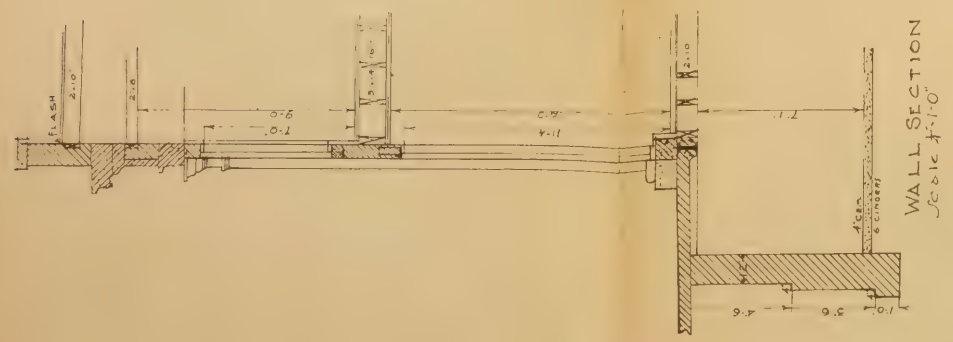
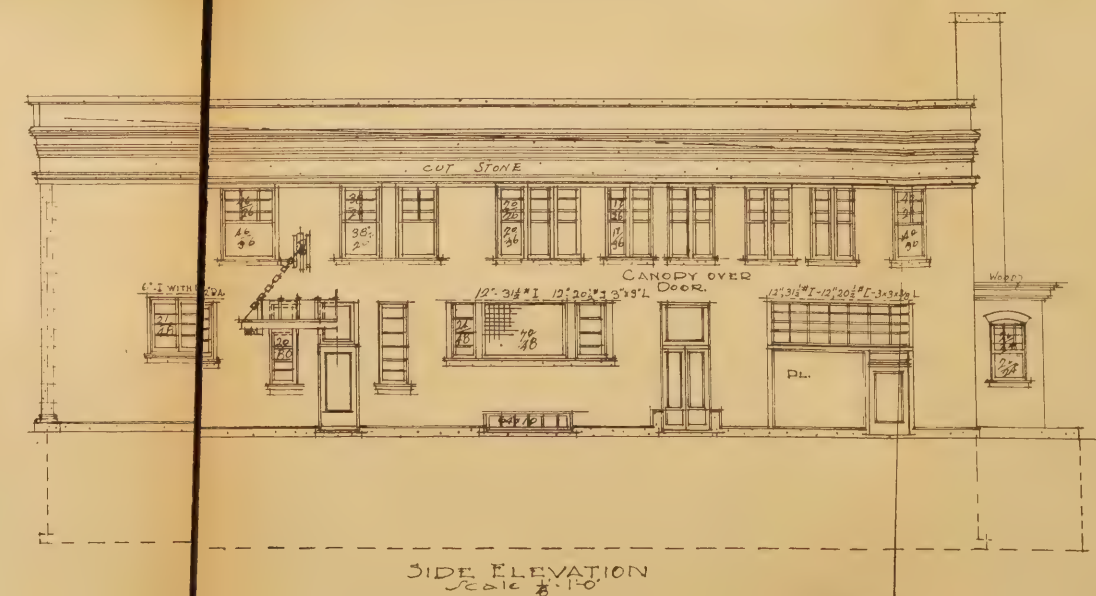
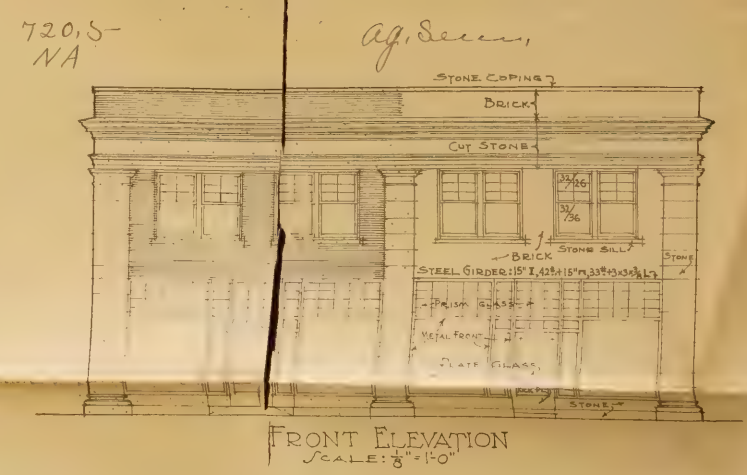
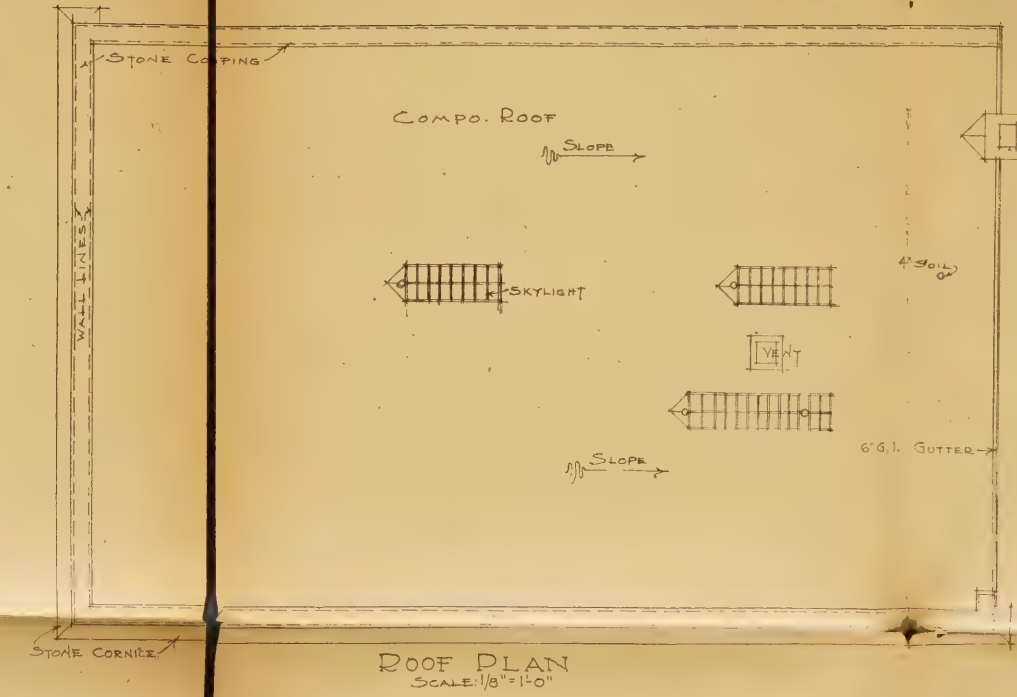
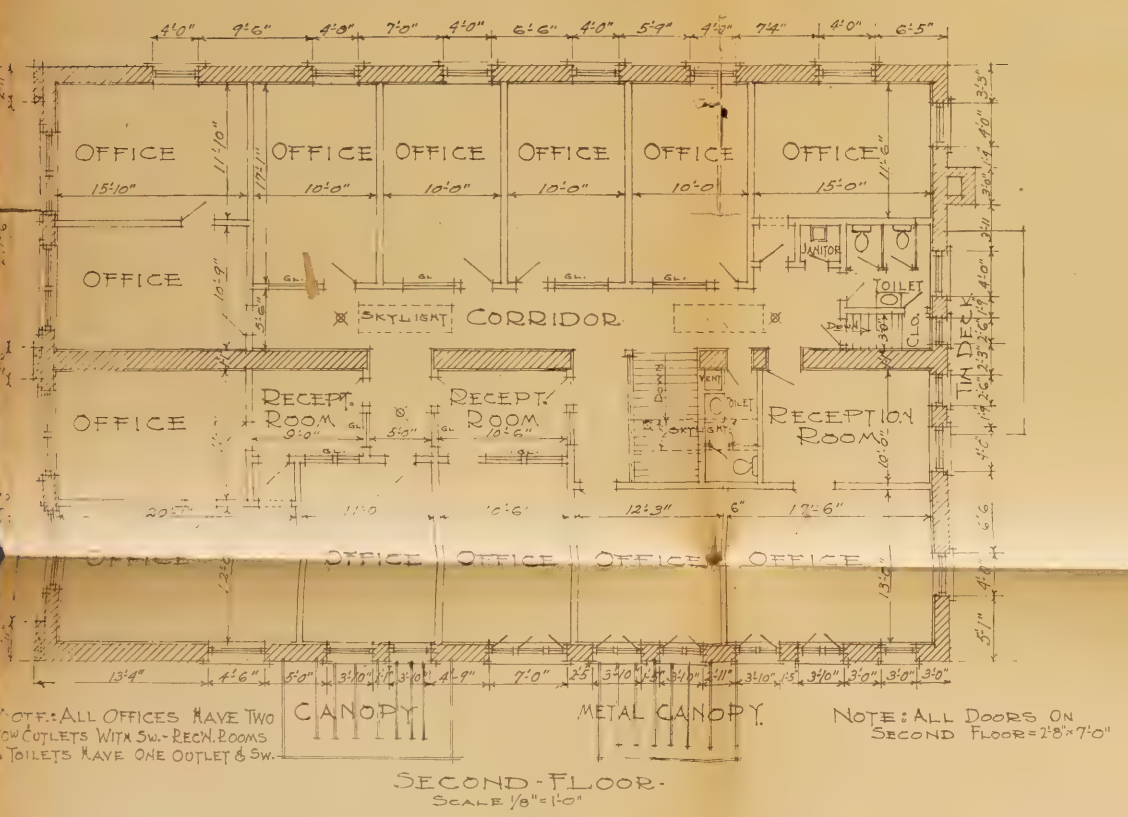
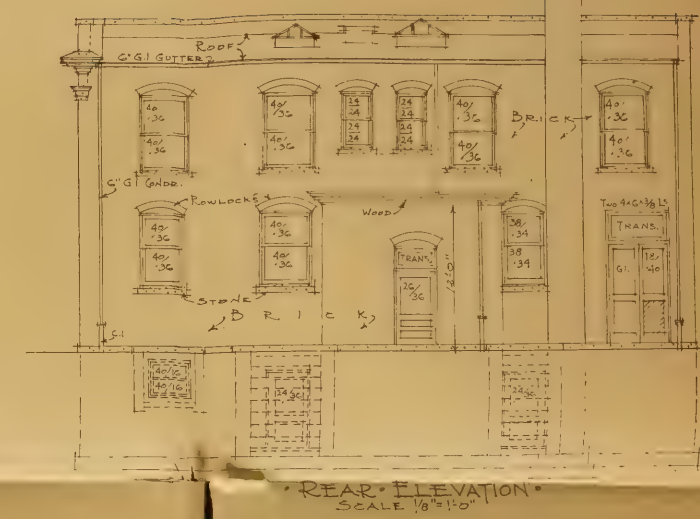
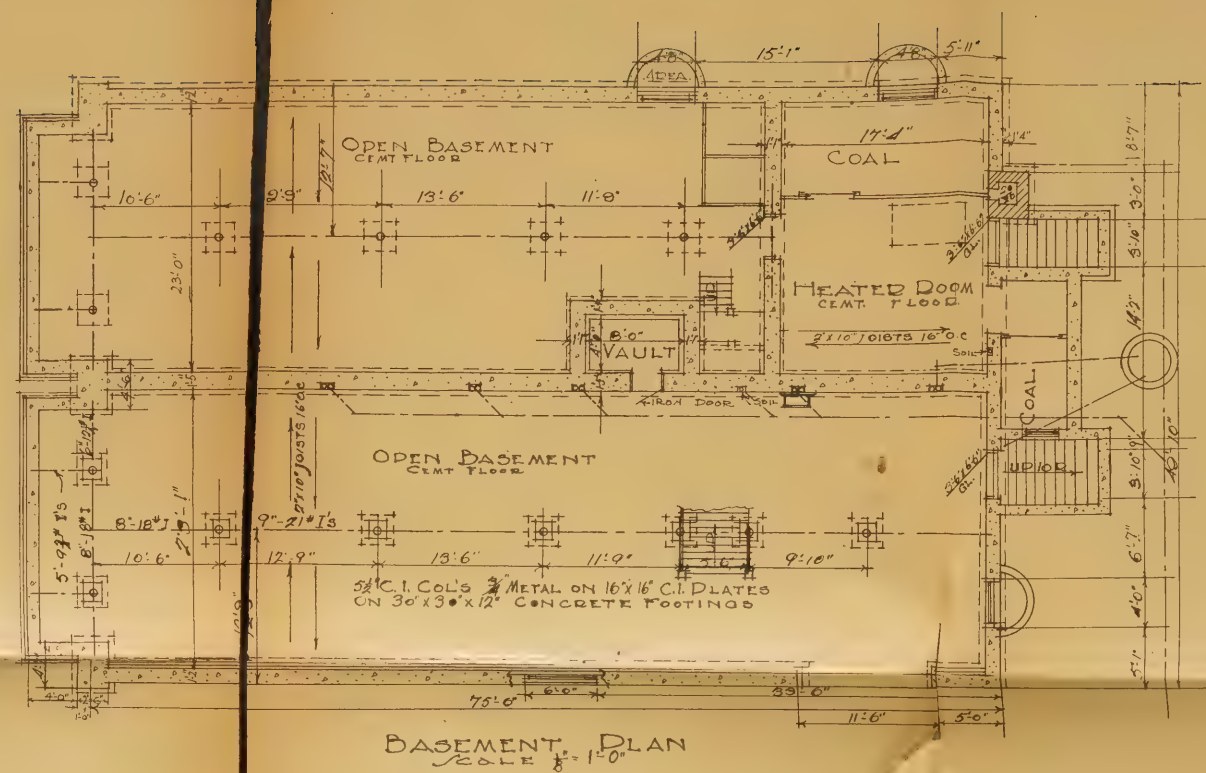
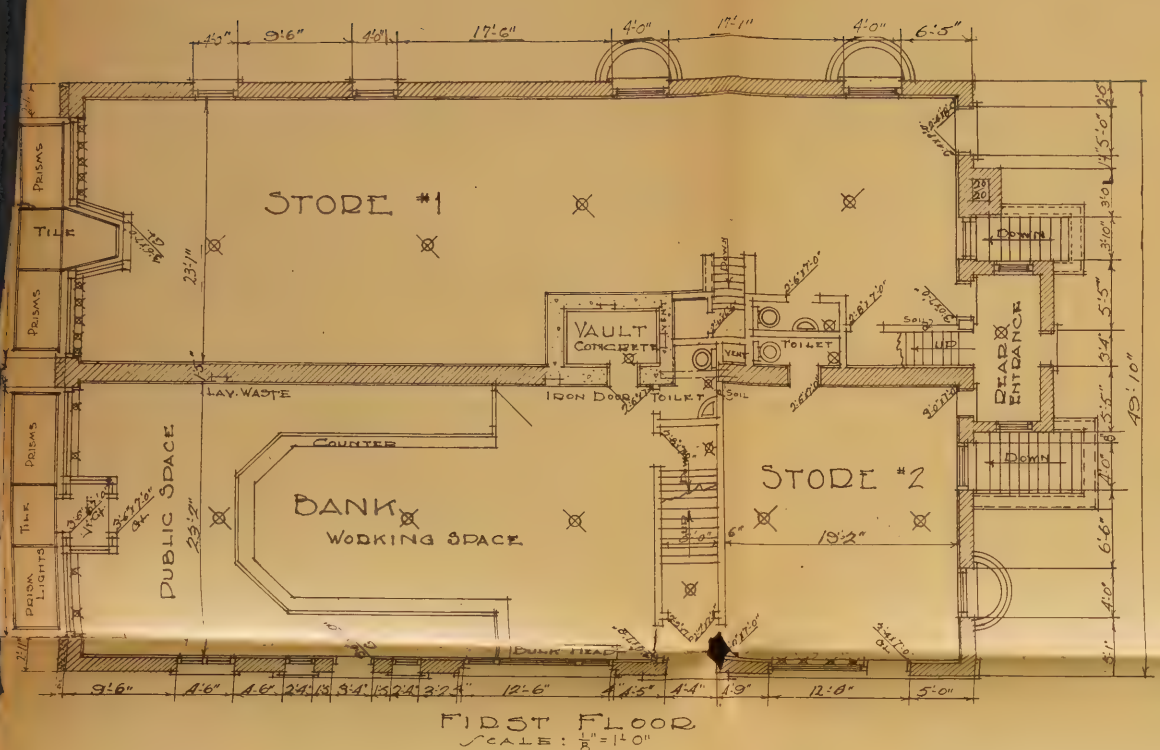
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APRIL, 1919

NATIONAL BUILDER DESIGN No. 464: STORE AND APARTMENT BUILDING

Scale for Plans and Elevations: 1/8 inch equals 1 foot

For Description see Reading Pages



SUPPLEMENT TO
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 MAY, 1919
 NATIONAL BUILDER DESIGN No. 465; STORE
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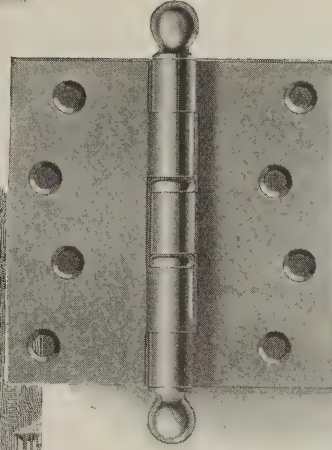
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Candy and Ice Cream
Chemical and Metallurgical
Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
Cotton
Daily Iron Trade & Metal
Market Report
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter
Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical Review
Electrical World
Embalmer's Monthly
Engineering World
Engineering and Mining Journal
Engineering News-Record
Factory
Farm Machinery—Farm Power
Foundry (The)
Furniture Manufacturer & Artisan
Furniture Merchants' Trade
Journal
Gas Age
Gas Record
Grand Rapids Furniture Record
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Iron Age
Iron Trade Review
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Steam Fitter
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Motorcycle & Bicycle Illustrated
Motor World
National Builder

Some Record Scores

Clough-Bourne Corp., New York
 Selden-Breck Constr. Co., St. Louis
 U. S. Government--in U. S. and overseas
 The Austin Company, Cleveland
 Snare & Triest, New York
 E. I. Du Pont de Nemours Co., Nashville
 James Stewart Co., New York City
 Mason & Hanger Co., New York

39 machines

16 machines

267 machines

14 machines

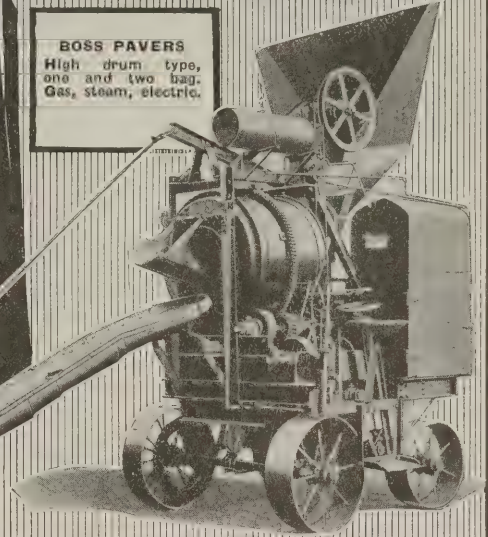
11 machines

19 machines

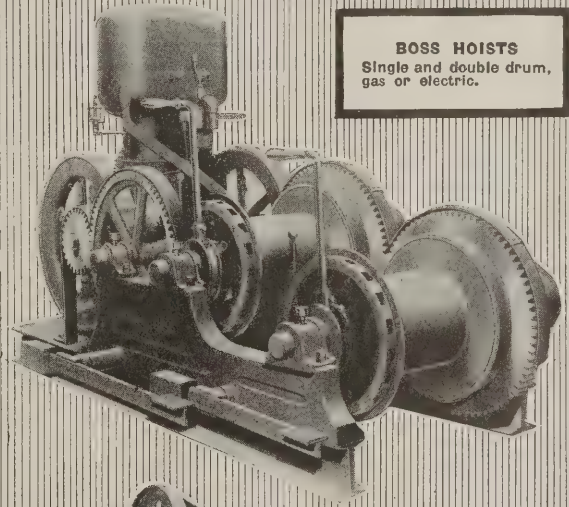
16 machines

18 machines

BOSS PAVERS
 High drum type,
 one and two bag.
 Gas, steam, electric.



BOSS HOISTS
 Single and double drum,
 gas or electric.



Others using two to ten BOSS mixers—James Black Masonry and Contracting Co., Lord Construction Co., New York; Degnon Contracting Co., New York; Boyce Robertson Construction Co., Richmond; Chas. J. Wacker, Indianapolis; Minneapolis Steel & Machinery Co., Minneapolis; General Construction Co., Spokane; A. C. Norton, Denver; Harrison Construction Co., Charleston; John A. Hunt Co., New Orleans.

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BOSS EQUIPMENT
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BUILDING MIXERS
 (Concrete or Mortar)
PAVERS
GROUTERS

BACKFILLERS
HOISTS
CARTS
MATERIAL ELEVATORS

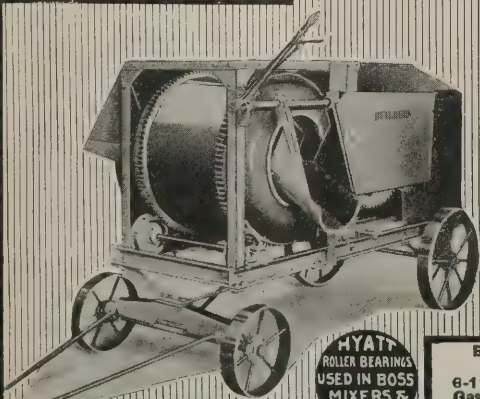
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The American Cement Machine Co Inc

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 THE 300,000 HP ELECTRIC CITY

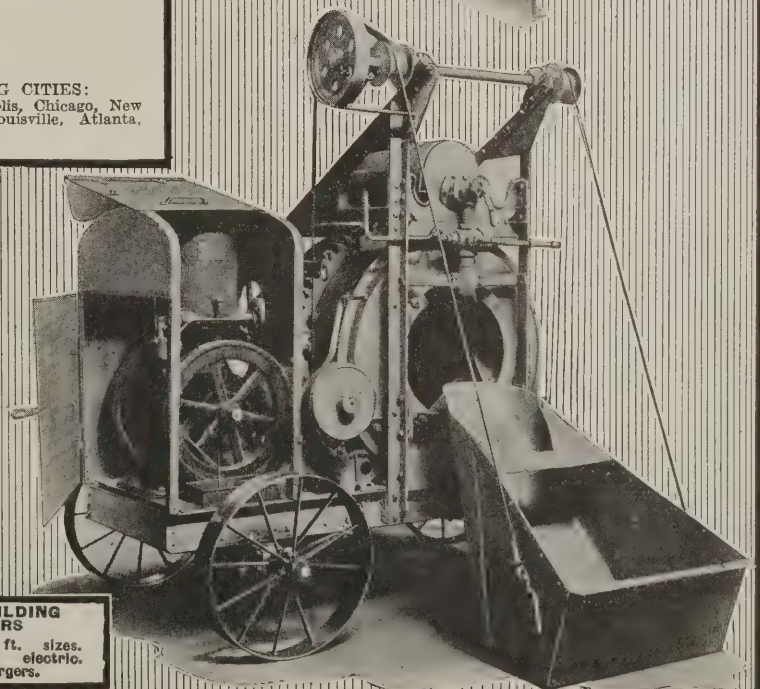
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 New York, Pittsburgh, Richmond, Cambridge, Mass.; Indianapolis, Chicago, New Orleans, Minneapolis, Seattle, Spokane, El Paso, St. Louis, Louisville, Atlanta, Springfield, Ohio.

BUILDERS' HANDY MIXER
 \$100 up—half-bag size, low
 chargers.



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 ROLLER BEARINGS
 USED IN BOSS
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BOSS BUILDING MIXERS
 6-11-15-22 ft. sizes.
 Gas, steam, electric.
 Also low chargers.



When writing advertisers please mention National Builder

OAK FLOORS

(that make Good Homes Better)

EASY TO GET-NESS — Profitable Business in Reflooring with Oak

Thousands of homes have old soft-wood floors that a reflooring of three-eighths OAK FLOORING would transform into durable beauty.

We have tested and proved how easy it is to start this line of profitable work in almost any neighborhood.

No need to wait a single day to start a real building boom with satisfaction and profit for all. We believe in it strongly enough to be starting a big National Advertising Campaign into millions of city, town and country homes this year, telling about OAK FLOORING.

Right now we have some practical helps which we send without charge to start this building boom in any community. There was never a time when so many people had the money to pay for the work. But they don't know how easy it is to get a handsome OAK FLOOR right on top of an old soft-wood floor.

We are pushing the idea strongly, and every Dealer and Builder and Carpenter can profit by our work.

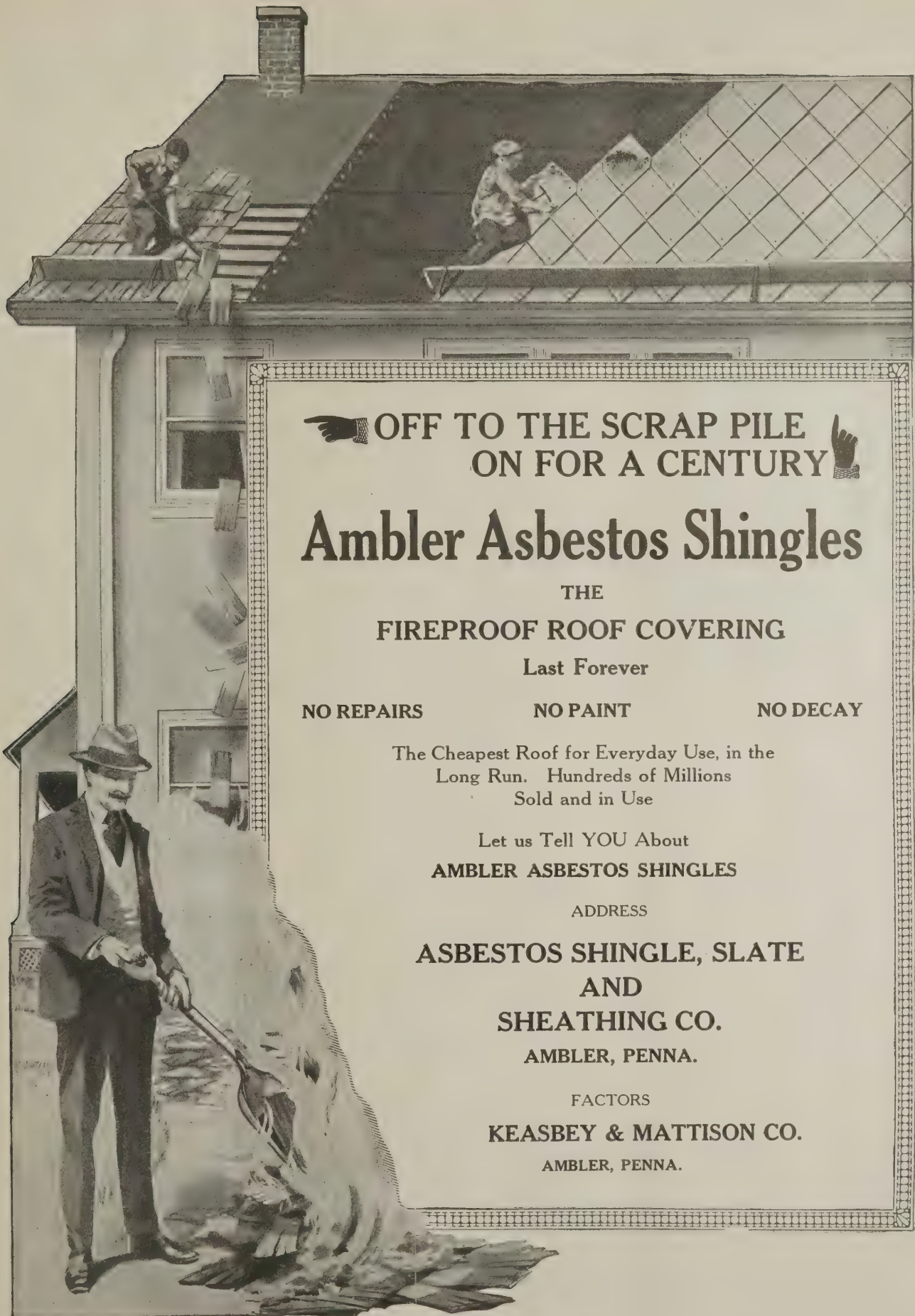
Direct, specific OAK FLOOR Sales Help will be given wherever it is needed to develop this stream of easy, profitable business.

Write today for those Oak Floor Sales Helps. They're good.

OAK FLOORING MFRS. ASSN.

1005 ASHLAND BLOCK:

CHICAGO:



OFF TO THE SCRAP PILE
 ON FOR A CENTURY

Ambler Asbestos Shingles

THE
FIREPROOF ROOF COVERING

Last Forever

NO REPAIRS NO PAINT NO DECAY

The Cheapest Roof for Everyday Use, in the
Long Run. Hundreds of Millions
Sold and in Use

Let us Tell YOU About
AMBLER ASBESTOS SHINGLES

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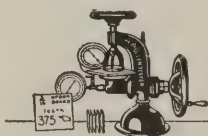


Look for famous Blue Center

The distinctive construction of wall board with two light colored surfaces and a colored center originated in Upson Board five years ago.

Imitators are now seeking to approximate the distinctive construction and appearance of Upson Board with its famous BLUE center. Buyers are, therefore, cautioned against deceptive imitations "made to look" like genuine Upson Board.

How U. S. Tested Upson Board



The Mullen Testor, used by the U.S. Government, shows that Upson Board will withstand a pressure of nearly 400 lbs. per square in.

A well-known competitive board tested only 240 lbs.—another competitive board tested 220 lbs.

Upson Board is nearly twice as strong as the average fibre board.

This Trade Mark protects you

The Upson Trade-mark on every piece of Upson Board, is your sure protection against inferior imitations. If the imitation had merit of its own, it would not be necessary to make it look like Upson Board—the board that will help both your reputation and your pocketbook.

*When you see a colored center,
think of the originator—*

UPSON-PROCESSED BOARD.



UPSON

THE PROCESSED BOARD

When writing advertisers please mention National Builder

color-blind -

*And even if you were—
you could not be deceived
by imitations of Upson Board*

—that some manufacturers would like to foist upon you.

Any fair comparison of Upson Board—the trail blazer of wall boards—with any other board, quickly proves its superiority.

Test its greater strength by breaking a piece of Upson Board with your fingers. You will see Upson Board is stiff and hard, like a piece of soft pine. Most wood pulp boards, however, are soft and break like a graham cracker. They are “fluffed” to scrimp on the quantity of raw material because air is cheaper than fiber.

Cuts Like Wood

Or whittle a piece of Upson Board! You will find it cuts with a smooth, clean edge like wood. The greater strength and stiffness of Upson Board explain why carpenters say they can apply one-third more in a day's work than they can of weak, spongy wall boards.

Have a piece of Upson Board tested on the standard Mullen tester. It will prove that Upson Board is nearly twice as strong as other wood pulp boards.

Upson Board is different in every way. It has ten other points of superiority besides strength, stiffness and hardness. These exclusive qualities make possible the wonderful record of less than one complaint to every three million feet sold and used.

The famous BLUE center of Upson Board is simply an easy mark of identification for the protection of the buyer against imitations made to “look like” Upson Board.

Protect Your Reputation

Your reputation is your biggest asset. When you install wallboard, be sure that it is going to give the lasting service that will really protect your reputation.

You cannot afford to use cheap wallboard.

Upson Board has a reputation of its own—based on real performance—less than one complaint for every three million feet sold and used.

And it means easy work—for Upson Board looks, feels and works like lumber. Carpenters tell us they can apply one-third more of Upson Board in the same time.

Let Upson Board guard your reputation. Then you can be sure that the most dependable board made is back of you.

We'll be glad to send you samples so that you can test Upson Board yourself. Write for them today.



Secretary

THE UPSON COMPANY, LOCKPORT, N. Y.

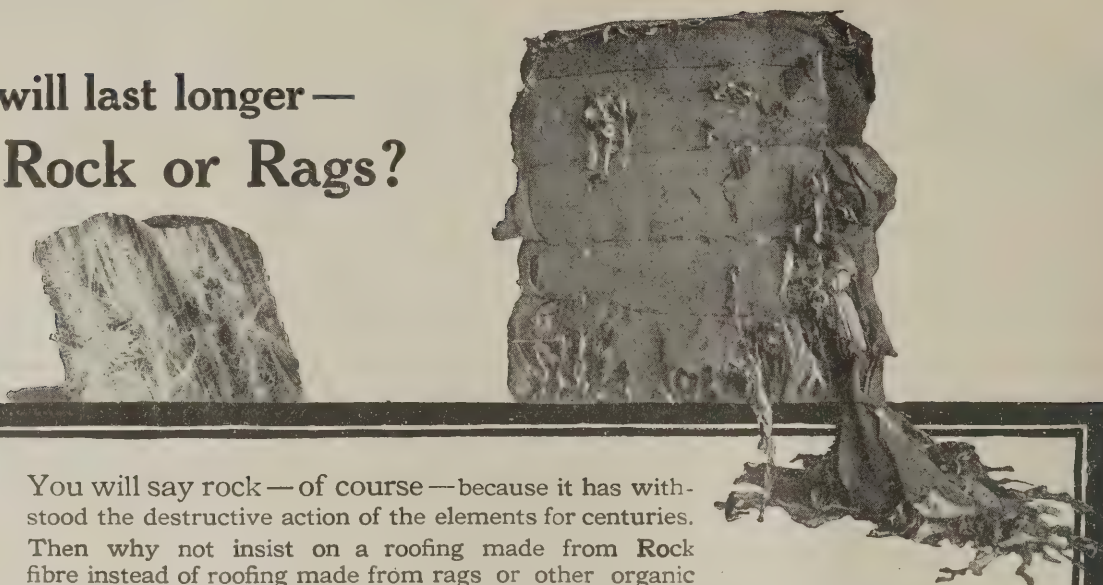
BOARD

WITH THE BLUE CENTER



When writing advertisers please mention National Builder

Which will last longer — Rock or Rags?



You will say rock — of course — because it has withstood the destructive action of the elements for centuries. Then why not insist on a roofing made from Rock fibre instead of roofing made from rags or other organic material. Asbestos is the only known mineral fibre from which roofing can be made. It will permanently resist the destructive action of time and the elements and the ravages of fire.

ASBESTONE

(Approved by Underwriters' Laboratories)

Asbestone is a Johns-Manville Roofing made of Asbestos rock fibre which repels fire and resists the action of fumes, acids and varying weather conditions. Being all mineral, it cannot rot, disintegrate or dry out. Therefore painting is never required.

Asbestone is a mineral fabric, composed of imperishable Asbestos fibre, waterproofed with natural asphalts. It has a gray mottled Asbestic finish on one side, smooth, black surface on the other. Can be laid either side to the weather. Rolls contain all necessary fasteners for laying.

Lowest Cost-per-year Roofing

You do not buy roofing for a week, or a month, or a year. You buy roofing to last as long as the building itself. To make sure that you get such a roofing insist on Asbestone. Ask your dealer to show it to you. Examine it carefully, and remember that you have our assurance that on a cost-per-year basis Asbestone is the most economical roofing you can buy. The first cost is the only cost.

Register Your Roof With Us

Our responsibility to you does not end with the sale. You can register your roof with us, which puts it on our records as Johns-Manville Roofing in service. Whether it's Asbestone or any one of the other Johns-Manville Asbestos Roofings, our Responsibility does not end until you get the service promised.

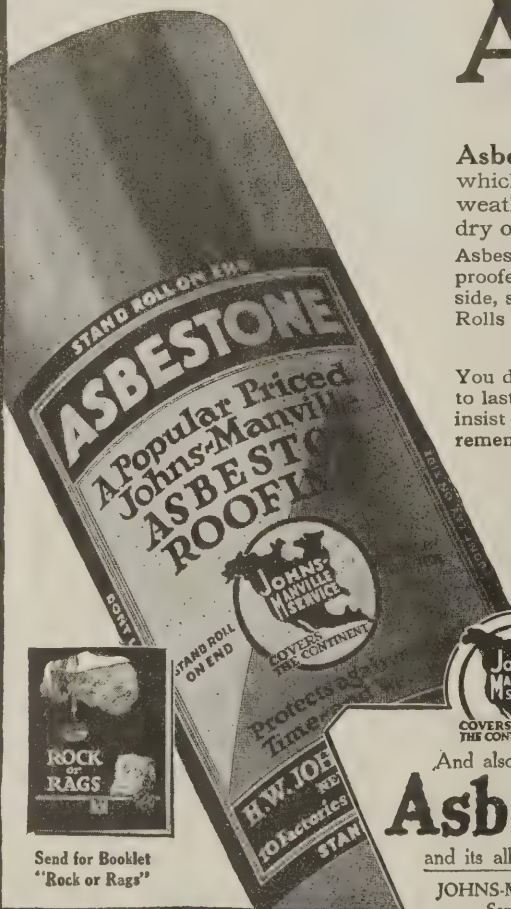
Other Johns-Manville Roofings

Johns-Manville Asbestos Roofings are made in great variety for all roofing needs. Johns-Manville Asbestos and Colorblende Shingles. Johns-Manville Ready Asbestos Roofing. Johns-Manville Built-Up Asbestos Roofing for flat surfaces. Johns-Manville Corrugated Asbestos Roofings.

To the Trade:— Address nearest branch for particulars

H. W. JOHNS-MANVILLE CO.
New York City

10 Factories—Branches in 63 Large Cities



And also through—
Asbestos

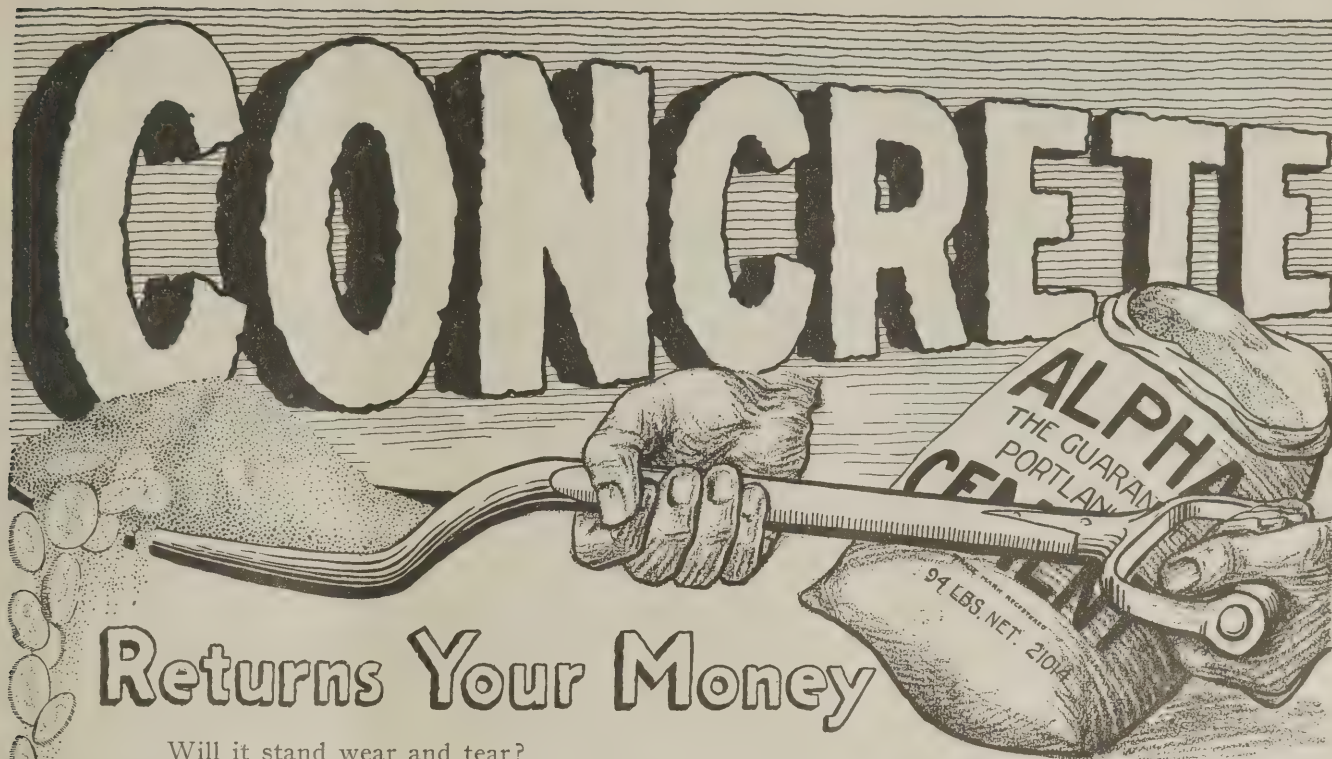
and its allied products

JOHNS-MANVILLE
Serves in
Conservation

Heat Insulations, High
Temperature Cements,
Asbestos Roofings,
Packings, Brake
Linings, Fire
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ASBESTOS ROOFING



Returns Your Money

Will it stand wear and tear?
 Will it resist fire, water and wind?
 Will it save on repair, paint and insurance expense?

Can it be built of easily obtained materials?
 At the end of a 10- or 20-year period will it rank high as a building investment?

These are questions that the judicious property-owner asks himself in these days of careful planning.

CONCRETE answers every question with a big YES.

Build with good sand, stone and ALPHA Portland Cement, and the result will be a

structure almost as enduring as if it were hewn out of solid rock.

Test ALPHA Cement if you prefer, but you don't have to, for it is tested hourly by chemists at every ALPHA plant and goes out in bags stamped "Guaranteed" to meet standard specifications invariably.

ALPHA CEMENT—HOW TO USE IT (96 pages illustrated) free if you live east of the Mississippi. If any of the following subjects interest you ask for the ALPHA Blueprint Service Sheet, mentioning NATIONAL BUILDER.

Workingmen's Homes
 Walkways and Driveways
 Concrete Roads
 Bridges and Culverts
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 Storage Cellar
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 Small Dam
 Milk House
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 Manure Pit
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 Oil Storage Tank
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 Corn Crib
 Storage House
 Smoke House
 Hog House
 Poultry House
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Alpha Portland Cement Co.
 GENERAL OFFICES: EASTON, PA.

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ALPHA The Hourly Tested and Guaranteed Portland **CEMENT**

Home and Ho July Issue of

600,000 Homes Needed


Authorities declare the country is short 600,000 buildings—homes. There is plenty of money with which to erect these, but the people are undecided.

To help builders bring their clients to a decision—to **BUILD NOW**—the Home and Housing Number will be a stimulant to action, and of lasting value.

Further, it will contain all types of houses—bungalows, cottages, duplex, two-family, apartment, detached, semi-detached—in all varied construction design, and material. Consequently the issue will have lasting as well as current values. It will be a reference catalogue for years to come.

Tradepress Publishing Corporation,

Using Number National Builder



The July Issue of National Builder Will Be Devoted to Home Building and Housing

An issue devoted to showing how builders can fan the flame of activity. In it will be incorporated successful methods for holding building shows. Photographs will help to make the visualization easy.

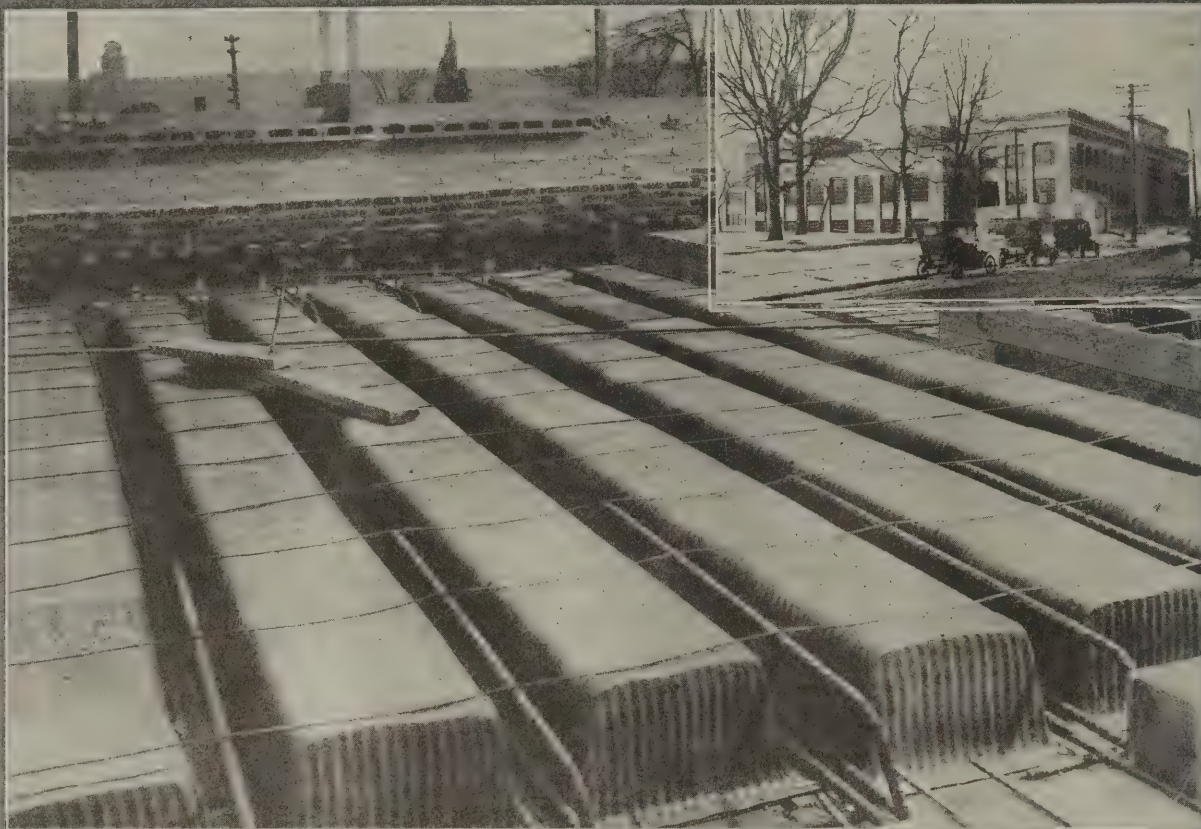
This will be but one of the methods explained—one of the plans for overcoming present obstacles. There will be pages devoted to industrial housing. How contractors put up these necessary structures at lowest cost.

In short, the July “Home and Housing” Number will classify the existing situation for the builder; make him see what he must overcome; and explain how others are successfully meeting his problems.

Instructive—Inspirational—an issue of sense and sunshine.

The source of material with which to enthuse prospective owners—to overcome their objections; and to meet their needs.

542 South Dearborn Street, Chicago



***A Few of the Schools Built
with Floor-cores***

Public School, Belleville, N. J.
Chas. Granville Jones, Archt.

High School, Alta, Ia.
Smith & Keffer, Archts.

Glenwood School, Marion, O.
Mariott, Allen & Hall, Archts.

Austin Blair School, Jackson, Mich.
Leonard H. Field, Jr., Archt.

Parochial School, Superior, Wis.
E. Ulrich, Archt.

High School, Chagrin Falls, O.
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Horner School, Wilkinsburg, Pa.
Ingham & Boyd, Archts.

Steel Floor-Cores In School Construction

In addition to Fire-Resistance, Strength, Permanence and Economy, Floor-Cores offer two special advantages for school buildings.

The long spans permit rooms unobstructed by columns or beams.

The concrete and dead air space between floor and ceiling will not transmit sound.

Floor-cores are splendidly suited to the construction of all sorts of buildings in which people live and work.

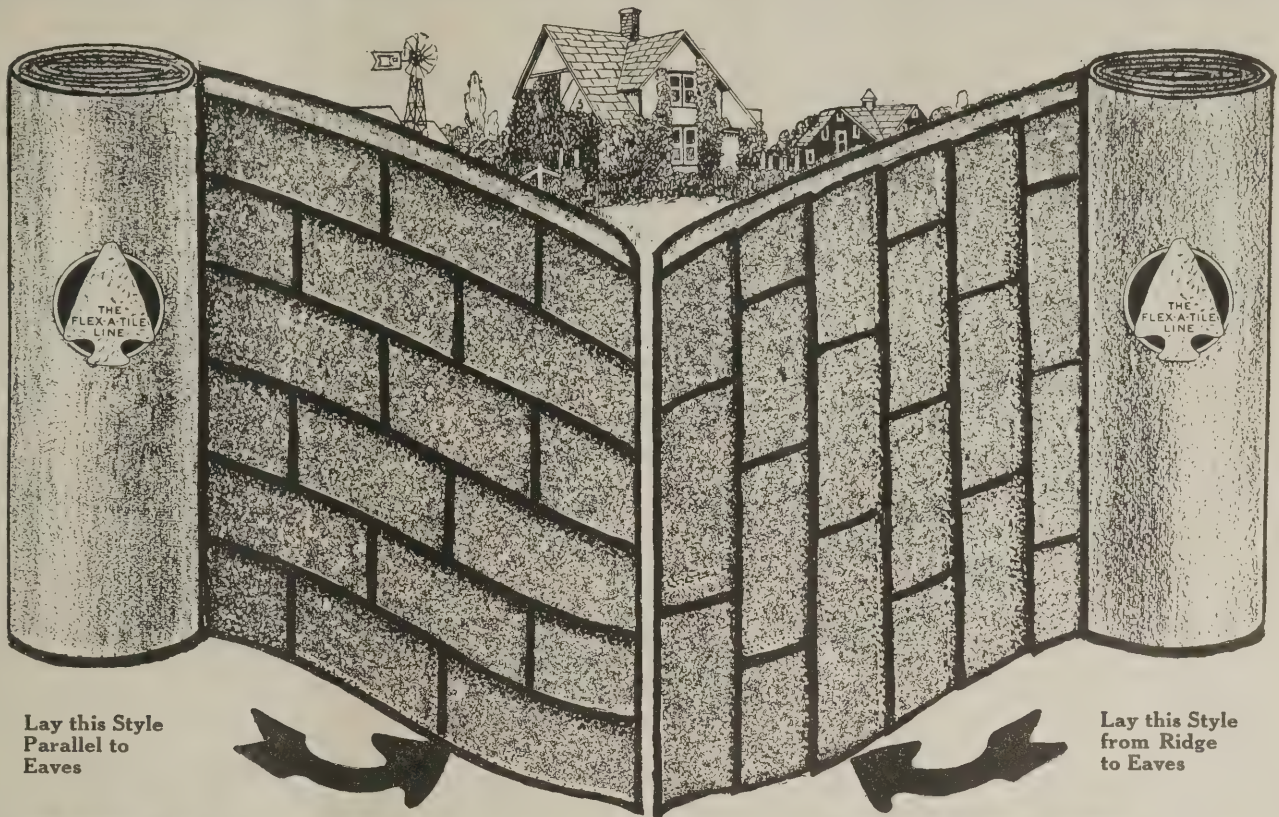
THE BERGER MFG. CO., Canton, O.

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BERGER

**EXPANDED METAL LATH-FLOOR CORES-REINFORCING PLATES-METAL LUMBER
STEEL FILING CASES-LOCKERS-FACTORY STORAGE BINS AND SHELVING
STEEL CEILINGS-ROOFING-SIDING AND OTHER PRESSED STEEL PRODUCTS**



Flex-a-Tile

ROLL SHINGLE

A Real Shingle Effect

GREAT DURABILITY—QUICKER—CHEAPER

Thousands of roofs in this country will soon be added to the great number already covered with Flex-a-tile Roll Shingle Roofings. Why? Because it contains every factor desired by the owner who wants an artistic shingle effect obtained at the lowest cost of labor and material with a definite assurance of great durability.

Proven Materials—After a quarter century of use it is definitely known that Asphalt Roofing is properly made, gives satisfactory service under all climatic conditions.

Flex-a-tile Standard—And it is most definitely proven that the superior standard of Flex-a-tile Roofing manufacture gives greatest service.

Selected Fibre of greatest strength and long length forms the Flex-a-tile Felt Base. And this is impregnated with Highest Heat Test Asphalts.

Real Shingled Effect. By our Patented Process the shapes of individual 5-inch by 7-inch Shingle Butts are raised from

the surface so you can actually feel as well as see them.

A Great Saving in cost is made on every job roofed by Flex-a-tile Roll Shingle Roofing. Yet it produces a roof of beauty and long-lasting satisfaction.

Roll It On over any old shingle roof or the sheathing of a new building—nail it on quickly—the job is easily done by any handy man or ordinary mechanic.

Profit and Pleasure come to the Dealer and Contractor who handle this roofing of unusual quality. It is adapted to hundreds of different types of buildings. It makes new friends in steadily increasing numbers.

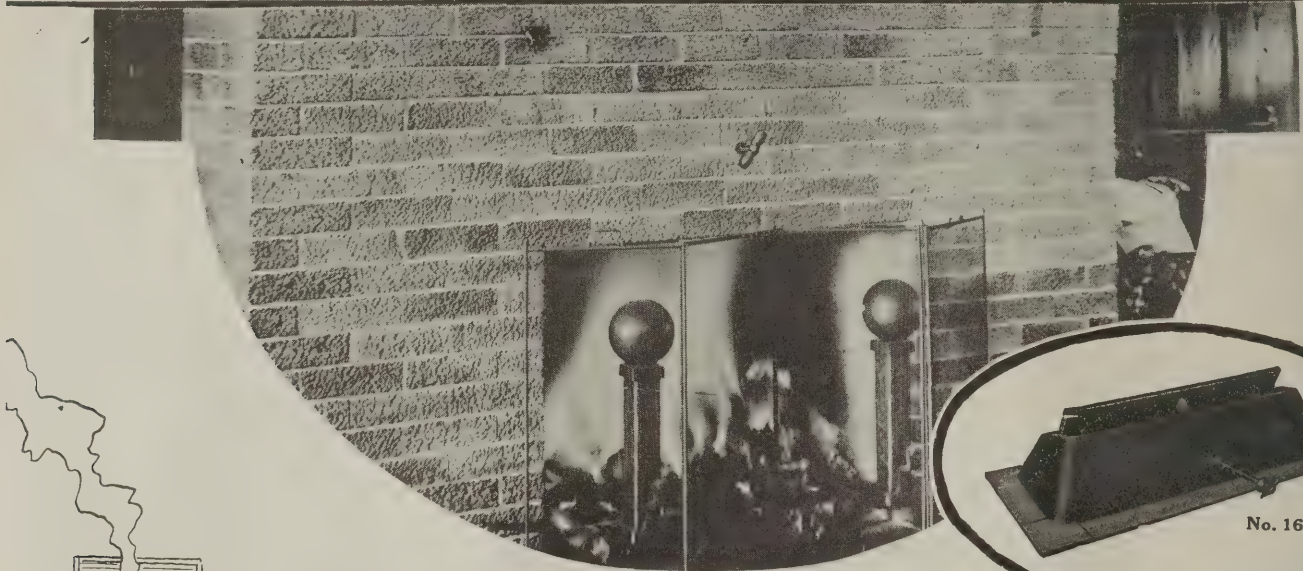
**FLEX-A-TILE HAS NO SUPERIOR in Waterproofing Qualities—It Is Fire-Resisting
It Brings Lowered Insurance—Class C—by Fire Underwriters Laboratories**

Send for sample. Learn all about this satisfactory roofing. Ask for Bulletins 1511 and A23.

The Heppes Roofing Co.
Mills at Chicago, Ill., Lockland, Ohio, Rutherford, N. J.

We gladly help you on all roofing problems. Correspondence invited.

When the Test Comes



It makes little difference at the time you install the fireplace whether you include a good damper—or any at all. But when your clients have moved in and the first fire is made—that's when your reputation will be sizzled to a crisp if there isn't a

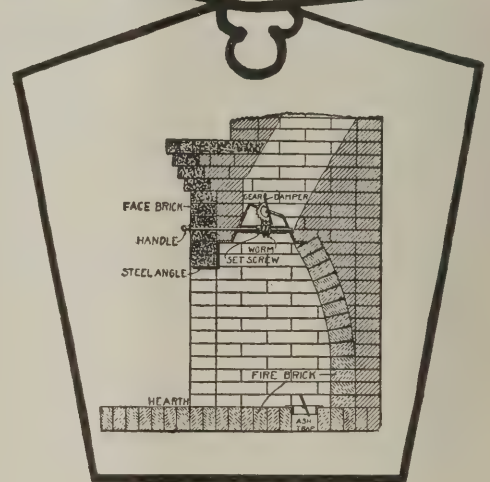
Stover Damper

to regulate the fuel consumption and to keep out wind and rain.

Don't try to reduce the cost by leaving out a damper. It's poor policy. And if you use a Stover you will reduce the labor cost of

erecting the entire fireplace. It supports the brick work.

The price is low enough to permit installation in every fireplace. Made in several styles for any size opening.



Catalog 1954 shows our complete line of fireplace fixtures. Get it!

STOVER MFG. & ENGINE CO.

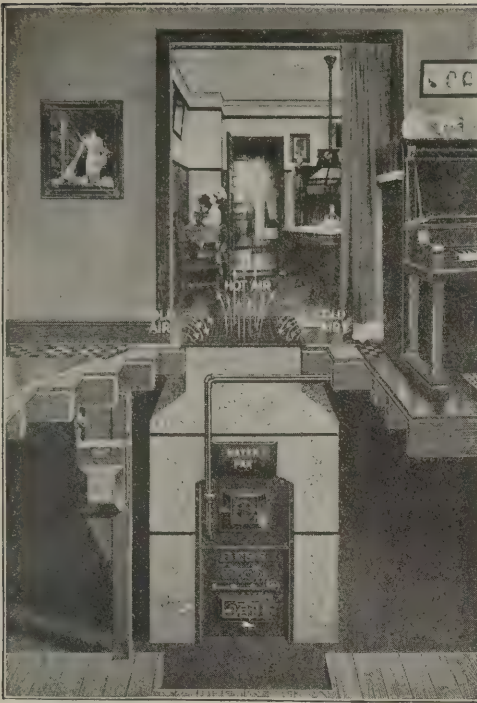
35 East Street, Freeport, Ill.

Manufacturers of Hardware, Wind-mills, Feed Mills and Gasoline Engines

Stover Mfg. & Engine Co., 35 East St., Freeport, Ill.
Send us Catalog 1954.

Name Business
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The Hess Pipeless Furnace—One Register Only, for Hot and Cold Air

THE HESS

Pipeless Furnace

Warms the Whole House —With One Register

No horizontal pipes; no cold air ducts. The heat is distributed thoroughly and evenly; all cold air is drawn off the floors. Moisture (humidity) added to the air gives your home a healthful, summer atmosphere.

SAVES COAL—you can burn **ANYTHING**; the cheapest soft coal gives results equal to anthracite. We tell you how to get flame and heat from soft coal, instead of smoke and soot.

NEVER LEAKS, for all seams are **welded** and never open from expansion or contraction. The inside is smooth; no flues nor smoke passages to clog and prevent radiation.

We make **pipe furnaces** also; six sizes, for separate pipes and registers.

We Guarantee Our Lowest Prices Now, to All Buyers

Right now, the dull season, is the best time to buy. Lower prices, later, seem improbable, but if we should reduce our rates before October, we guarantee to refund all early buyers, an amount equal to any reduction we may make. Therefore, you are guaranteed the season's lowest prices on your early purchases.

Terms: Cash, Liberty Bonds or easy monthly payments. Send us a sketch of your house, for our estimate and our plan, showing the size and location of every detail required.

Our 48-page illustrated book on furnace heating is free. Let us send you one.

Contractors, Attention!

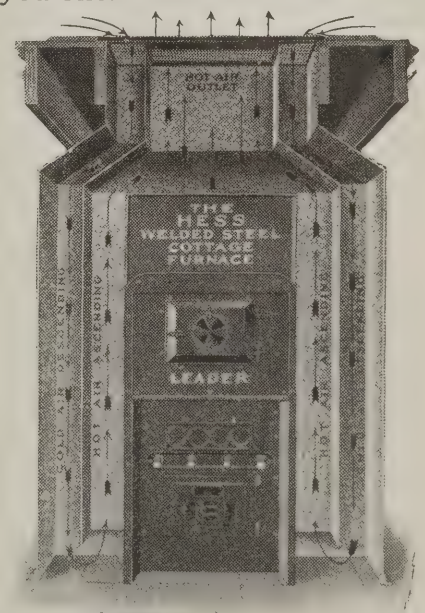
Our special contractors' rates mean better prices and better quality than you can obtain from catalogue houses and dealers.

We carry a big line of tin and galvanized pipes and fittings and registers, and we supply everything you may need, big or little, for furnace heating.

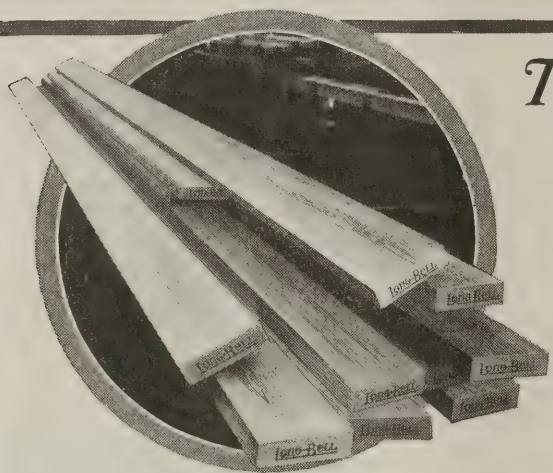
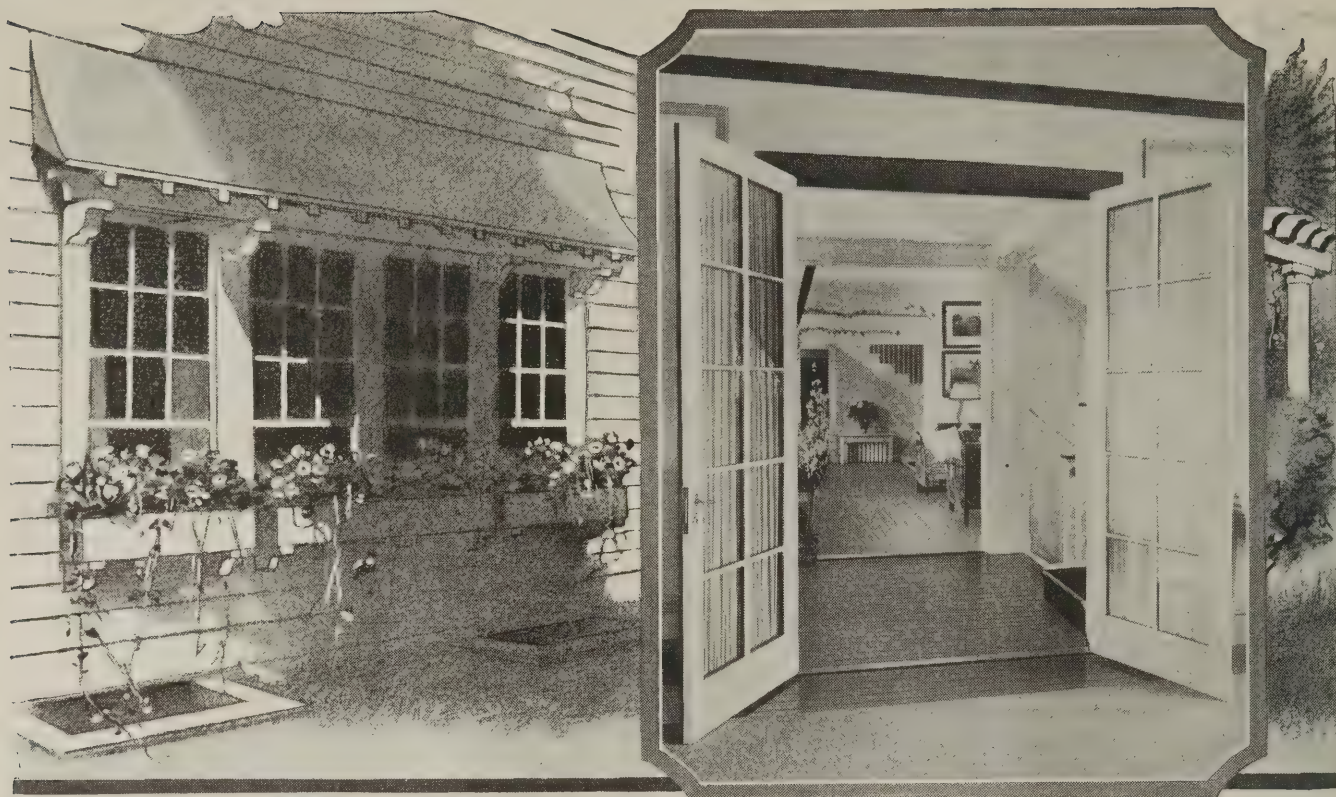
Hess Warming & Ventilating Co.

907 TACOMA BUILDING, CHICAGO, ILL.

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Inner Detail—Showing Travel of Hot and Cold Air in the Hess Pipeless Furnace



The **Long-Bell** Lumber Company is the largest manufacturer of Southern Pine in the United States. It puts its name on its entire product—550 million feet a year. Look for the name on these materials:

Southern Pine, Hardwood, Oak Flooring, Creosoted Lumber, Ties, Posts, Poles, Piling and Wood Blocks.

Ask your dealer for **Long-Bell** Brand

The Long-Bell Lumber Company

R. A. LONG BLDG.

KANSAS CITY, MO.

The Name Behind the Lumber

Behind every piece of **Long-Bell** lumber there is more than forty years of lumber experience and more than a quarter of a century of lumber milling. Into every piece of our product goes our entire reputation, because we brand every piece with our trade-marked name—

Long-Bell

THE MARK ON QUALITY LUMBER

With 13 mills and lumber manufacturing plants, every one equipped with the last word in lumber making machinery, it is our pride to produce as nearly a perfect product as it is humanly possible to make. We add to our equipment a rigid adherence to grading rules and a maintenance of extreme standards of workmanship.

"Own Your Home" Movement The Need of the Hour

See Page 30 of this issue of
National Builder



NATIONAL BUILDER

Volume 62

Chicago, May, 1919

Number 5

The Building Situation

Opportunity Never So Great for the Builder—Great Change in Views—Facts Disclosed by Government Investigations—Guarantees Now Made That Prices Will Not Go Above Present Prices—It Is Now Understood That They Cannot Go Down—Now Is the Time to Build!

By Allen E. Beals

ANY practical builder should be an Optimist today! His profession has risen in importance. It has become a concern of the Government, and competes with agriculture as a necessity of life.

National authority is perplexed to find 600,000 homes **this year**, on a conservative estimate, for America's inhabitants.

Up to November 11, 1918, just five months ago, construction was almost completely barred. Only \$300,000,000 worth of building was allowed to proceed, outside of that required for war purposes. This three hundred million dollars' worth of building for the **entire country in eleven months** is equal to the construction work in a single large city for **one year** in normal times.

Since then up to April 1 construction has gone ahead, with projects amounting to \$250,000,000, indicating a total of \$600,000,000 worth of building work—supposing no further monthly gains are made.

But gains must be made for there is urgent need for three times that annual expenditure.

Pessimism must be banished by the builder himself. He must realize that the entire country is rising to meet the need for building—rising in even mightier power that it rose to meet the power of the Hun.

We are the richest people in the world today. We have to readjust things a little, and we are readjusting them rapidly. Prices and credit—money—have kept us thinking at cross purposes.

The facts stated in this column last month have found their way into the minds of the people, and the trouble now is that instead of the fear that prices will go down in a few years and not leave the value in a building equal to that which was put into it, that prices will go up before projects can be started.

This sharp turn in the mental attitude of prospective builders has been met by the voluntary guaran-

tee of manufacturers and material men that **prices will not be advanced for a year.**

The long-awaited for stabilization is here!

The builder's customer must be shown. He needs to learn from you the national demand that keeps the cost up where it is. He sees your estimate and then decides to wait! For what? Does he imagine that by waiting he will gain? If so he is unprofitably advised, unless he is prepared to wait at least five years. He needs to know that immigration will be stopped, and that the labor that is leaving the country will keep costs up even more than the war itself.

But the big view—the one in which the Government is most concerned—is that which is presented by industry. A myriad mills are closed, and each day their doors and gates are locked labor has to be distributed elsewhere. This distribution is invariably toward the great cities. The greatest menace to building is in this condition; not from political sources, but from the increasing cost to the mill men to produce that which builders use in assembling structures. The exodus from mill centers puts a premium on the services of the men who stay and thus the figures of manufacturing costs show that the reduction in prices hoped for

by the builder's customer cannot be realized for a long, long time—when everything else has come down also.

Opportunity is here! The builder need not hesitate. National statistics prove that building is unleashed and is gaining headway for one of the most prosperous eras America has ever known.

It is up to the builder to take hold of the opportunity. To know it and—to realize it—and then go out and show his customer where he can turn his money faster in construction than by holding it in futile hopes of lower cost.

Prices have now been stabilized at rock-bottom figures.

The writer of this forecast, Allen E. Beals, is in close touch daily with all the conditions that affect building prices. This forecast has been specially prepared for **National Builder** and reassures all contemplating building to **Build Now!**

Building Permits for March

Permits from 162 Cities Show Construction Activity 65 Per Cent Normal as Compared to Average for Last Five Years—February Was 50 Per Cent Normal—71 Per Cent Gain Over March, 1918

BUILDING permits officially reported to the American Contractor from 162 cities of the United States for the month of March show that momentum is being gained in construction activity.

The total estimated value of permits issued is \$60,176,987. This is a very satisfactory amount as compared to the estimated value of any month since the armistice. These estimated values are, in round numbers:

Month	No. Cities	Estimated Value
December	151	\$17,000,000
January	152	23,000,000
February	153	32,000,000
March	162	60,000,000

71 Per Cent Gain Over March, 1918

The total, \$60,176,987, compared to the total \$35,315,327 for March, 1918, shows a gain of 71 per cent over March of last year.

Both years, however, fall far below the standards of previous years as shown by comparison to the estimated value of March permits for years 1914-1919:

Year	No. Cities	No. Permits	Estimated Value
1919	161	49,084	\$59,791,345
1918	161	20,211	35,051,897
1917	116	23,406	79,284,262
1916	119	26,218	84,384,464
1915	119	28,932	71,342,907
1914	64	61,393,181

As shown in this table, 1918 is the only year in which permits for March are exceeded by the 1919 estimated values.

Building 65 Per Cent Normal

The average value of permits per city during the last five years is approximately 5,700,000. The value of per-

mits per city for 1919 is approximately only \$3,700,000. While the fact must be taken into consideration that a city is by no means a fixed base to afford accurate computation, still the information taken thus is valuable. Comparing the figures for 1919 to the average figures shows 1919 activity to be approximately 65 per cent normal. Statistics for the month of February compared to the average of February figures showed that month to be only 50 per cent normal.

Small Projects Predominate

While the value of 1919 permits is exceeded, in no case is the total number of permits issued approached. This is significant because it shows that the average value of permits in 1919 is small as compared with normal years, showing that much of the 1919 activity is expended on repair jobs and small projects.

In the matter of value of individual projects, improvement is shown over the first two months of the year. The average value per permit for March is \$1,218, for February \$1,900, and for January \$1,700.

112 Cities Show Gain

The number of cities in which gain is shown is 112 as against 50 showing loss. Among the most important cities showing loss are Yonkers, N. Y., St. Joseph, Mo., Springfield, Mass., San Diego, Calif., Philadelphia, Pa., Bronx (New York City), New Orleans, La., Harrisburg, Pa., Jersey City, N. J., and Louisville, Ky. In most of these cities there was war-time activity carried on last year, and while the conclusion cannot be made arbitrarily that these cities show decreases simply because their relative amount of construction was greater last year, still indications point to that as a reason for the comparative slump this year.

See the Inspiring Story of the Credit and Money Situation on the Next Two Pages. Note the Various Constructions Described and Illustrated Throughout Succeeding Pages--- and the Supplement Giving Full Working Drawings of a Fine, Practical, Store and Office Building.

Amortization Will Help

The Question of Money Can Build

By S. W. Straus,

AT the present time one hears much complaint about the unwillingness of financial interests to lend money for building projects. Among the various reasons put forward to account for the dullness in the building industry, has been that many lending institutions are not willing to make loans on real estate security. However much of truth there may be in such statements, no question has been raised as to the soundness of the real estate situation. Quite a number of lending organizations have declined to look with favor on building projects because of unstabilized conditions and the fact that higher prices prevail than existed heretofore. While building costs are higher now than they were before the war, materials used in this industry are low compared with the prices of food, clothing and commodities in general and there is no doubt in the minds of most men conversant with the situation, that we rapidly are reaching stabilized conditions.

During the four years prior to 1918 the average increase of wages in the construction industry in forty-one leading cities in the United States was 27.5 per cent., while the increase in commodities during the same period was 94 per cent. In addition to these basic facts no more direct recommendation of a specific class of loans ever was given official utterance than a statement given out recently by the United States Department of Labor, when, after investigation of the American realty market, it said:

"Investment in building always

has been considered the safest for the individual."

Notwithstanding these conditions, there has been complaint from those engaged in the building industry that they could not secure adequate

WHAT AMORTIZATION MEANS

Amortization means lessening the debt each year.

For instance, a ten-year amortized mortgage for \$10,000 at 6 per cent would mean this:

Each year \$1,000 of the principal would be paid, so that in ten years the entire mortgage would be wiped out; thus the 6 per cent interest would only apply on the un-met part of the principal; at 6 per cent the interest at the end of the first year would be \$600; at end of second year only \$540; end of third year \$480, and so on.

funds for carrying out their plans. Many of the large lending institutions such as the insurance companies, trust companies, and savings banks have not been in a position where they could be of help in financing construction work due largely to the methods employed by them in making loans. It is gratifying to note that a widespread movement in mortgage reform has been inaugurated, however, and the sit-

uation should rapidly improve as a result of these remedial changes.

It is one of the lessons that should have been learned many years ago, but it required the present readjustment period, with its manifold complications, to bring to light the defects of the old system and reveal the needs of radical mortgage reforms.

The situation may be briefly explained as follows: A great amount of capital available for building operations in former years is now tied up in Liberty Bonds. The life insurance companies have been drawn on very heavily as a result of the influenza epidemic which has necessitated the payment of an abnormal number of policies. The principal cause of the present lack of available funds at the hands of these organizations, however, is that they have been making loans without any adequate provision for their gradual reduction or amortization. That is, instead of the loans being reduced by certain fixed amounts each year, they have been carried along from year to year with little, if any, payments on the principal. It is estimated that there are approximately \$10,000,000,000 in realty loans carried by all lenders on mortgage securities whether private or institutional, of which \$6,000,000,000 are held by savings banks, trust companies and insurance companies. The larger portion of these \$10,000,000,000 of securities based upon real estate in American cities and towns, carry no provision for gradual reduction. If these loans in the aggregate or to a great extent had been

The Building Situation

Loans Settled. Now Be Had Now!

the Noted Banker

made on amortized mortgage security, there would be a vast sum of money flowing into the lending institutions each month which could immediately be applied in financing new projects.

It is in the widespread adoption of the principles of amortization in realty loans that the present reform movement consists and it is because of this fact that one is justified in making this statement that the amount of money available hereafter for building projects will be continually more plentiful as a result.

In applying these principles it must be remembered that a loan can not be amortized unless the property itself produces sufficient income so that the debt or a large part of it must be paid out of the income from the property. This is the only fair and scientific arrangement. There is no reason why the income from buildings should be diverted to other purposes, thus depriving the building industry of its own natural fruits.

With the application of amortization, the income from buildings goes toward the erection of other structures, thus creating a natural growth and upbuilding; thrift with both borrower and lender is promoted and the entire industry is stabilized because of the fact that its development is based on scientific principles. The general adoption of amortization will hurt the speculator—"the mushroom" promotor—but all worthy and legitimate building operations will be benefited.

That it rapidly is becoming ac-

cepted as the ideal method of making loans was shown recently when a canvass revealed that all but 18 per cent of the leading financial institutions of the country were in favor of the application of the prin-

BUILDING SECURITY

A Building Proposition that will stand investigation can now be financed easily and profitably to all concerned. The credit of the Builder—Your Knowledge and Skill—is now recognized as a National Asset. The Federal Reserve Bank comes to the aid of your banker—you no longer have to chase around to find a customer who will buy your mortgage. You can do business and buy your credit as you would buy groceries. But you must be worthy of the credit and your proposition must stand the test of showing that it will make you a profit—which is a safeguard to you also.

ciples of amortization to the loans made by them.

Through the device of bond issues secured by a first mortgage on real estate the situation can be still further benefited, because bonds of this kind divided into popular denominations will furnish a medium by which the general investing public can give that degree of financial

support to the building industry which is now so badly needed. The public long has financed railroads, public utilities and industrial corporations, but the realty market has very largely depended for its financial support on the large lending corporations. Since the greater part of building requirements consist of large projects running, in many instances, into hundreds and thousands of dollars, it would not be possible for the public to give any great amount of help to such financial tasks unless the mortgages on these constructions are made in the form of bond issues divided so that the individual investor can participate in them.

Thus the mortgage reform movement now going on will mean a great stimulation to the building operations of this country, although the financing of a very great percentage of all building operations of the future must be made with bond issues in order that the public may give its support to them.

Experience is teaching the popular investor the safety and desirability of these securities. Our Liberty Loan issues and our general practices of war-time thrift have created a tremendous new investing power in this country. The building industries are entitled to a full share of the support of this element and such support will contribute to the upbuilding of our American cities, afford the best possible outlet for the savings of our people and go far toward the encouragement of thrift among our people.

A Store and Office Building

E. E. Roberts, Architect

THE design of a small business building which is to house several lines of commercial work, is perhaps the most difficult problem to be encountered by a designer. In the first place, he is usually bur-

designer turns it into a den or a closet or some other appropriate feature and quits worrying about it. He can't do this with a business building, however, as the lot is too valuable to permit any unused por-

say that it can't be done, that it is impossible, and all of that. Remember that these men are not builders, show them **why** it can't be done. Point out that a certain amount of space is required for stairs, cor-

Complete Working Plans for This Building Form the Supplement to This Issue of National Builder. All Issues of National Builder Contain a Working Drawing of Some Practical, Successful Structure --- Not An Experiment, But a Building "That Is"

dened with the item of cost—the building must not **appear** cheap, and yet the amount of money to be spent on its construction must be kept down to the very minimum. Secondly, there is a given sized lot to be covered, and every inch—no more, no less—must be utilized to the best advantage. With the average dwelling house this condition is not often encountered. Residence lots are large enough to allow considerable variation in the arrangement of the rooms and if any waste space is left in the house itself, the

tion to be left over, either within or without the building.

The owners of business buildings are often very exacting with regard to the amount of space that is to be available for renting. Sometimes they are unreasonably so; they have figured out exactly how much income may be expected from a given number of rooms and will insist on crowding them in, carelessly indifferent as to whether or not the lot will hold them all. To meet this condition the designer must use tact. Don't fly off the handle and

ridors, toilets, light courts, etc., and that these things must be amply large or the offices will not be desirable ones. Crowded and dark halls and inadequate toilet facilities are the reason for many of the "for rent" signs that are displayed on business buildings.

If the building is on a corner the entrance to the second floor offices is often placed on the side street. This allows more display window space for the stores on the principal street and does not affect the offices, besides the lighting of the offices is

much simplified. Three of the walls — front, rear and side — are unobstructed and sometimes the party wall may be utilized. In the usual case, though, the party wall must be solid, and if the building is to have offices along this side they must be lighted by means of a light shaft.

The building chosen for the May supplement is an attractive building of the business type. It was de-

signed for the mail carriers' use; in the case of a bank this space would be available for safety deposit boxes, etc.

son impervious brick were used for the walls. These resist the dirt and smoke and always appear bright and clean. The trim is of limestone, buff in color to harmonize with the rich red brick. The canopies over the side entrances afford considerable protection from the weather and add a decorative effect that goes far toward relieving any plainness on this side of the building.

planned for the mail carriers' use; in the case of a bank this space would be available for safety deposit boxes, etc.

The other first floor room on the front is a large, well lighted room suited for use as a general store. The small store room near the rear of the building, on the side street, is used as a barber shop.

The second floor is devoted to office purposes. Thirteen well lighted



A STORE AND OFFICE BUILDING

E. E. Roberts, Architect

Complete working drawings of this building are the subject of this month's Supplement to National Builder

signed by E. E. Roberts, architect, and it is a well planned building in which every advantage of purpose and location is utilized.

As may be seen by referring to the photograph, it is located on a corner lot and consists of store rooms on the first floor with offices above. The building is located near the railroad tracks and for that rea-

The corner room on the first floor was designed for use as a postoffice, but as it would answer the purpose of a small bank equally as well, it may be called the bank room. Note the ample parking space for customers' autos that the placing of this room on the corner gives. In the original design, a portion of the basement under this room was

offices are provided, four of which are reached by means of large reception rooms. This is a case where the designer was fortunately able to utilize the party wall for lighting the offices along its side, thus a more complex plan with the attendant necessity for using structural steel to support light-court walls was avoided.

Building Business With a Building Show



A new idea in building shows originating in Oak Park, Illinois. Its fame has gone like a whirlwind over the land and what is known as the "Oak Park Model" has been taken as a basis for a campaign of Building Expositions throughout the U. S. The U. S. Government expressed great interest and has officially recognized the Oak Park Idea.

By the Director, Charles E. White, Jr.

SIX WEEKS before the show opened not a business man in our community of 40,000 people thought it would be a success. On the opening day twenty-six exhibitors had signed up for space, paying their money in advance; ten more had been refused accommodations because there was no more room. The business men opened their eyes and came down to see the attendance. The attendance was all there. From the time the doors were opened until they were closed a week later, throngs of people filed in and out. Automobiles extended a block long. Baby carriages lined the sidewalks. Inside the building was the clatter and buzz of a miniature city. The Exposition was on, and it was a success. It has just closed and the building business indicates an increase of about 95 per cent. The local market is flooded with plans being figured by contractors, and prospective house owners are rushing around trying to find vacant property for house-building purposes. One real estate agent, alone, sold \$180,000 worth of property the week of the show. Others have achieved like generous sales.

Like many great undertakings the Oak Park Housing-Living Exposition began as merely a dream and ended a real success. The ball was set rolling by the Own Your Home Campaign Committee, a committee of citizens working along the lines of the National Own Your Home Campaign.

"How can we reach the people and show them that prices are going no lower?" This was the great problem, for contractors, material-dealers and architects felt that though prices might sag this way and that to a certain extent there will be little change downward. Now is the time to build was the slogan, but how could it be brought to the attention of the people?

Then a building show was suggested. It was thought that a show containing exhibits of lumber, brick, mill-work and other building materials might excite interest and give the exhibitors a chance

What Is the Housing-Living Exposition Oak Park - River Forest?

¶ When will it be?

¶ What will it do?

¶ Will it help Oak Park—River Forest?

¶ Will it prove, unselfishly, of benefit to all citizens?

Big things are brewing. Big events will happen. Big purposes are behind these events. Watch for the first signs.

If you are a doctor, lawyer, minister, architect, banker, merchant, salesman, businessman; *watch.*

If you are rich; *watch.*

If you are poor; *watch.*

If you have a home; *watch.*

If you haven't; *watch.*

HOUSING-LIVING EXPOSITION
SOUTH BOULEVARD

The Last Week in March; 22 to 29, Inclusive
CHARLES E. WHITE, JR., Director

This is advance publicity and all statements herein are believed to be truthful. More facts will follow.

"OWN YOUR HOME"

The First Ad

to tell their story to the people. But who would get up the show and who would run it after it was started. Some job that would be. How could the money be raised? What would it cost?

Who would exhibit? Would the people go?

Running a Building Show is a business proposition. There are plenty of business men who will generously give a portion of their time to help any good thing along but here was a job, (manager of a building show), requiring some one to be responsible for the entire production; to put in an unlimited amount of time, put the deal through and *make it pay.* Who could do it?

The committee finally decided that an architect was the best bet for the job. Architects know all the contractors as well as all the material-men. They are doing business with these parties every day. At the same time they know the people who are interested in building, the ones who might be expected to go through the show. Could an architect afford to give the necessary amount of time to the project?

No, the architect finally approached by the committee decided that he couldn't give the necessary amount of time to the job unless he was paid for it. To leave his work and devote an unlimited amount of time promoting and running a Building Show cost him too much because it temporarily, at least, cut down his income. The committee thought so, too, and they closed a deal satisfactory to all parties concerned, with the architect who is writing this manuscript.

Now as to the proceedings, first, there was the main idea, the plan of the show to get up, something "different" that would attract people. Here is the plan: a Building Exposition for prospective house owners containing everything essential to the building and equipping of a home. Beginning with the foundations of the house, each exhibit was to take the visitor through the various stages of building a home up to the roof, including heating and plumbing, and then show him household equipment such as washing machines, vacuum cleaners, electrical apparatus, decoration and gardening.

Here was a complete education worth the viewing by anybody who ever expects to build, and as every man and woman in the world, probably, has that ideal uppermost in his or mind—to some time own a home—we were appealing immediately to a mighty large and influential class.

Next, there were the exhibitors to get in line, requiring a certain amount of money from them (enough to pay expenses) and in return giving them a large audience to talk to. Right on the start, the first bit of publicity was the rather mysterious ad reproduced on page 26.

Naturally this attracted attention, and people began to ask "what's it all about?"

Of course, the biggest idea of all was to make the Exposition of genuine help to the people, not merely a trading proposition to sell so many barrels of cement and thousand of brick. In these days of big vision everything must be run on broad gauge lines. There were no excuses to offer in running a show, and none necessary. The Government has come out and said "The patriotic thing is to build now," so we came out and said the same thing, at the top of our lungs. We shouted in the columns of the local newspapers; we purchased advertising space; we talked it on the street. The director wore out a perfectly good voice in urging "Squads right, MARCH," speechifying at business mens' organizations, womens' clubs, church bazaars and pink teas.

To those who are considering giving a building show I would urge, have a small executive committee as near like mine as possible. My committee consisted of George R. Hemingway, a real estate dealer and vice-president of a bank; Frank S. Collins, a lumber dealer, and Otto McFeely, a newspaper editor. As a committee it was a pippin. Every member on it was enthusiastic about the show and when I got discouraged and needed a little pat on the shoulder it was always forthcoming. What you want in a committee is something to lean upon, not something to hold you back all the time making you drag it along and carry your own load besides.

The exhibitors were secured in the following manner: A list of eligibles was prepared and to each of them was mailed a circular of which the following is a condensed copy:

Exposition

The Exposition is unique in that it embraces all the operations in the building and equipping of a modern house and includes all building materials and processes necessary for this purpose.

An actual set of plans and specifications of a model house designed by a well known architect is the basis for the exposition; all material and equipment necessary will be displayed in the booths of the Exposition, beginning with the

foundation materials, followed by materials and methods employed in the following:

Carpentry
Mill Work
Metal Work
Roofing
Electric Wiring
Gas-piping
Plumbing
Mechanical Equipment
Heating
Ventilating
Lathing
Plastering
Wall Board
Plaster Board
Interior Trim
Painting and Decorating
Glass

CALVIN H. HILL,
President Oak Park Village Board;

☛ Because it benefits Oak Park, the Housing-Living Exposition benefits you.

CHAS. F. DURLAND,
President River Forest Village Board;

☛ Dear to your heart is River Forest, the Housing-Living Exposition will help your village.

CARL HOWE,
President Oak Park Club;

☛ Standing for a better community, the Oak Park Club will be benefited by the Housing-Living Exposition.

DR. W. E. BARTON,
First Congregational Church;

☛ You always have stood behind community welfare: welcome, then, the Housing-Living Exposition.

MRS. JAS. A. SIMMONS,
President South Side Woman's Club;

☛ The Housing-Living Exposition makes for a better Oak Park-River Forest.

MAJOR W. F. SIMMS,
Commanding First Battalion, Second Infantry,
I. R. M.;

☛ You are ready to fight for Oak Park-River Forest; join in bringing the Housing-Living Exposition to a successful conclusion.

MISS HELEN A. BAGLEY,
Librarian;

☛ Of great educational value is the Oak Park Library; so is the Housing-Living Exposition.

W. J. HAMILTON,
Superintendent of Schools;

☛ You are guiding the education of our future citizens; the Housing-Living Exposition assists you in your work.

MRS. THOMAS M. JACKSON,
President River Forest Woman's Club;

☛ Your club is known for the good that it does; assist in fostering community spirit by supporting the Housing-Living Exposition.

MRS. GORDON L. WHIPPLE,
President Nineteenth Century Club;

☛ For years the Nineteenth Century Club has stood for the best in citizenship; assist the Housing-Living Exposition and help Oak Park-River Forest.

SEWARD M. GUNDERSON,
Home Builder;

☛ You have helped build Oak Park; help us make the Housing-Living Exposition worth while.

A "Personal" Ad.

Hardware
Weather Strips
Interior Furnishings

Gardens, trees, flowers, and shrubs, as well as garden accessories and garden furniture, will be displayed; bird houses are included.

Tickets

Paid admissions will be required, both afternoon and evening; ten cents for children, twenty-five cents for adults.

Advertising

The Exposition will be well advertised in Oak Park papers.

Notices will be posted at local clubs.

Announcements will be made at all the schools and in churches.

Special programs and feature days will be organized to make a special appeal. Contests will be held for which prizes will be awarded.

Some novel and unusual advertising ideas will be undertaken along such lines as these:

A poster or window display will be used showing a mason, carpenter, lather, roofer, plumber, and electrician in working clothes, with tools, standing at attention in a line. The card will read: "All dressed up and no place to go." What is the matter? Homes and apartments are scarce; rents are high; no place to move to; men are out of work—carpenters, masons, plumbers and the whole building craft. They ought to be building your new home or making your old home modern. Get busy. Give these men a job.

Another idea is to use a float in the business district of Oak Park and surrounding towns, carrying a number of workmen in their work clothes, each bearing a sign with copy such as (A) "I will build your foundation." (B) "I will put in your wire." (C) "I will put on a good roof." (D) "I will put on the cement," "plaster," etc.

Another plan is to have a big chart in a prominent place, tabulated to show the low rents of houses and apartments in 1917 as compared with the higher rents of 1919. A caption used with these will say, "The best way to bring down rents is to build more houses—to make competition. You can build with your rent money."

Another idea is to get the signatures of all persons contemplating building on a poster with the caption, "I am going to build right away to avoid the high cost of delay."

A great many other live ideas will be employed to boost the show and each advertising novelty will direct people to visit the show.

Special features will be incorporated to interest society people.

Music

Orchestral music will be provided afternoons and evenings.

Service and Fees

The Exposition committee will undertake to furnish a complete system of booths, each to be a standard unit of about 8 feet by 10 feet 6 inches, with background, side railings and posts, complete decorations and sign, for \$50.00.

Backers

Endorsed by

Oak Park Commercial Association.
Own-Your-Home Association.
Oak Park Trust & Savings Bank.
State Bank of Oak Park.
Superintendent of Schools.

This brought a few inquiries right away and these were followed up by personal interviews in the Exposition Office where the paid secretary of the director held forth every day. One of the problems was to keep out too many dealers in one kind of goods. For instance, too many lumber dealers, too many carpenters, too many masons and the like. Finally the list was fairly complete and then it was possible to limit space to one of each kind, as we realized that our exhibit would be uninteresting unless it covered the entire field of house building.

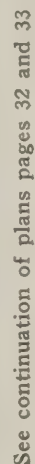
About this time, three weeks before the show opened, the affair got so big that it was felt some sort of public meeting should be held to give citizens a chance to listen to lectures on building

About Ten Thousand of These Plans
of a Two-story Cottage taken from Plans Previously
Shown in National Builder
were Distributed at the Housing-Living Exposition.

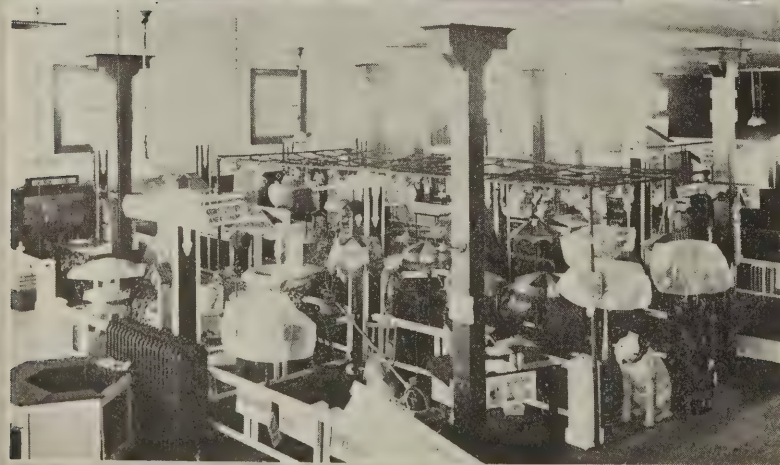
They Helped to Fix the Ideas
of Prospective Buyers and bring about
decision and action.

Exhibitors had their figures ready, based on these plans,
and Visitors got a definite idea of
relative costs of present day Building.





The "Own Your

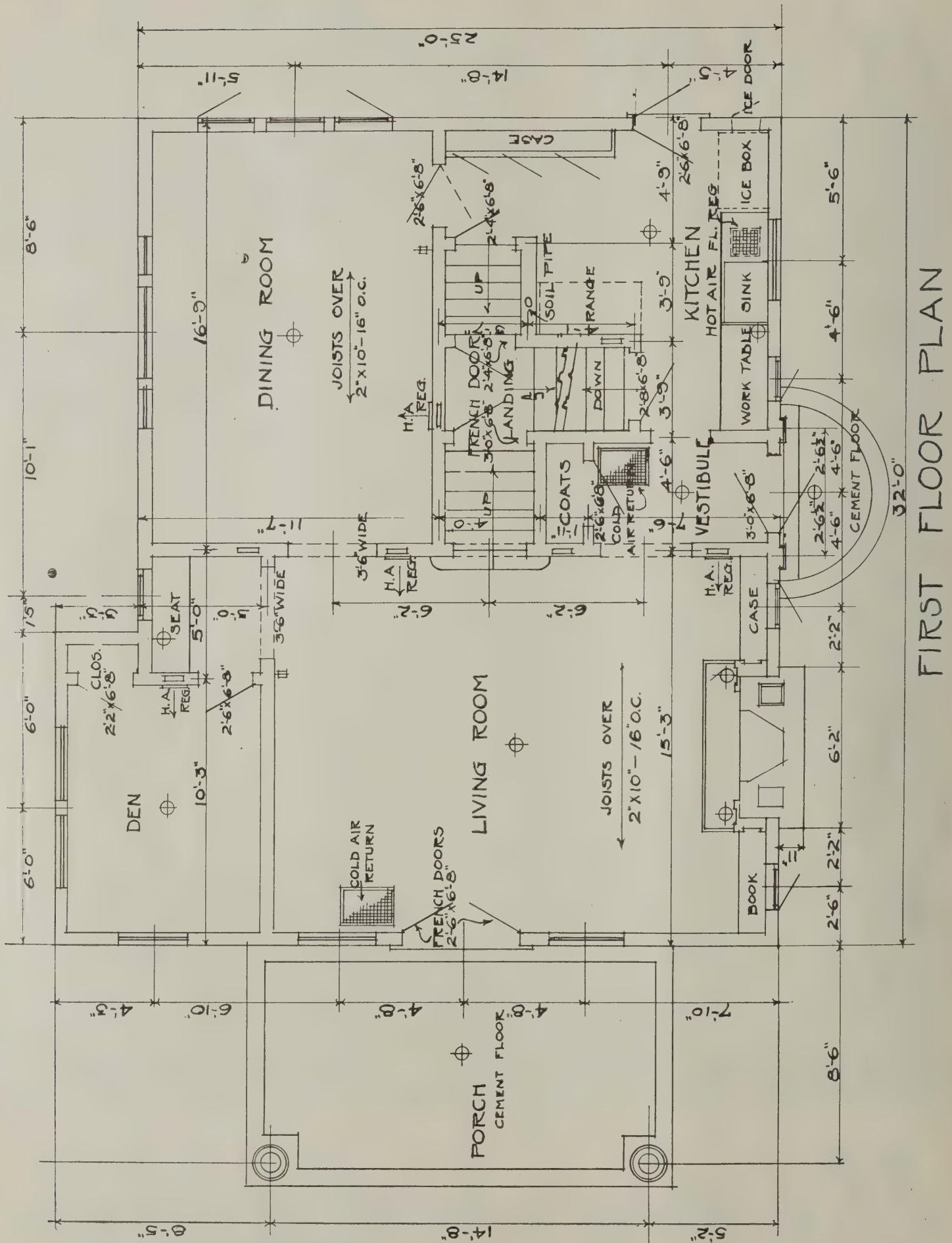


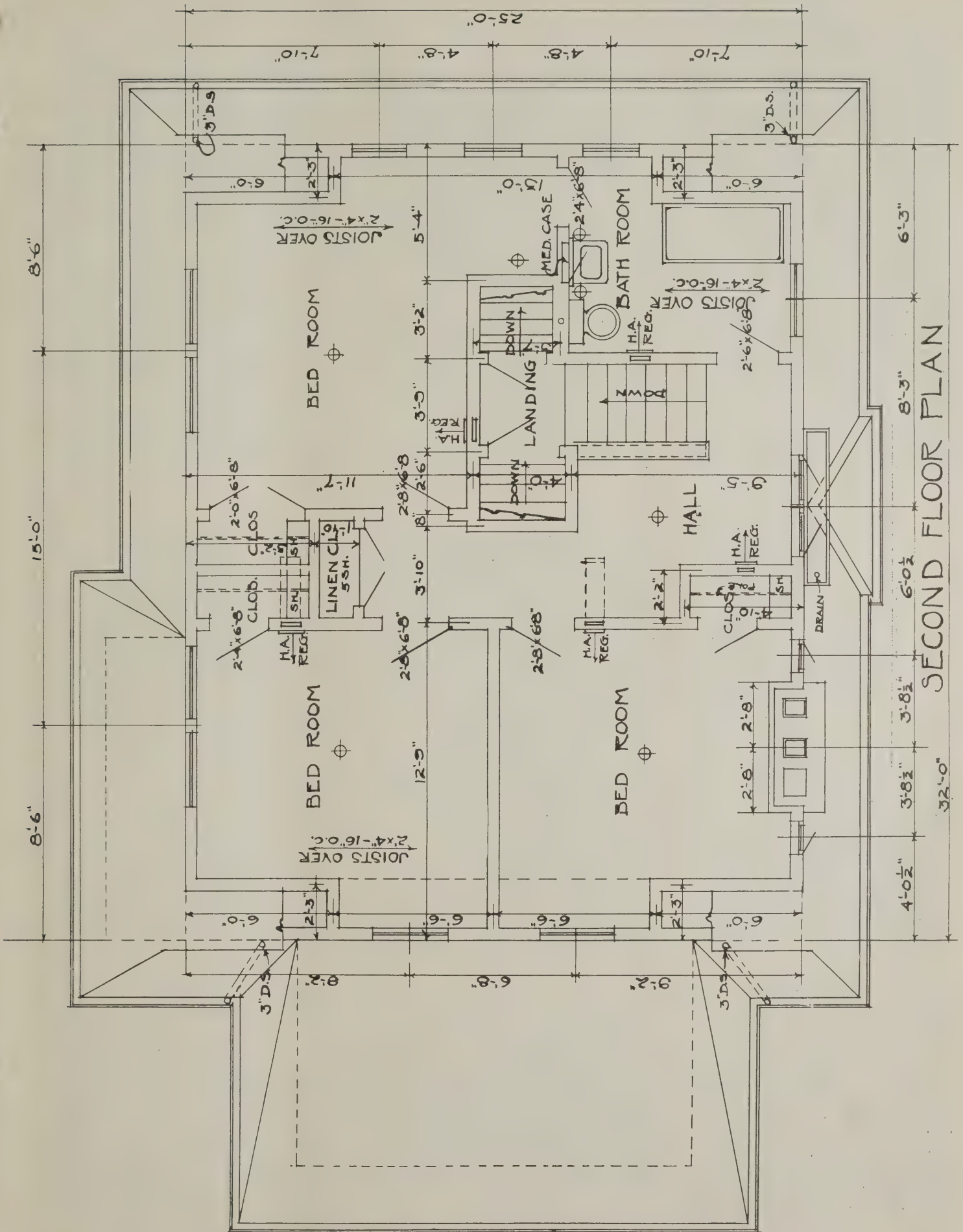
That Was All

Home Show



Big Success





topics, and that gave birth to another big idea—the Housing-Living Congress.

Delegates were appointed from all clubs, churches, schools and other organizations to attend the Congress which was held in the High School Hall, seating 1,500 people. The Congress was very broad gauge and really had nothing to do with the Building Show, itself, though it was a sort of preliminary to it and undoubtedly helped to attract attention to the show. The subjects discussed at the Congress were for the general welfare of the town—such as Schools, Churches, Clubs, Paving, Parks and Playgrounds, and Associated Charities. Not satisfied with things of merely local interest we thought we would tackle a few of the world problems, so we had a discussion of that timely topic, the League of Nations. If there had

store building, a good view could be had of the entire Exposition.

Along this line let me tell you of a few “don’ts.”

Don’t have high railings around your booths, which might destroy the view of any other booth.

Don’t wait until after the show to collect your money; get it in advance.

Don’t give a free show because people are apt to think a free show isn’t worth going to. Charge admission, but give away plenty of free tickets at a picture show and through merchants.

Don’t have many lectures during the show as lectures keep people away from the exhibitors and the latter do not like that.

Don’t forget to have an Architectural Exhibit; this always attracts attention.

Don’t pay for the current used by exhibitors for power; furnish them with

just what it would cost to build. So much for carpenter work (at the carpenter booth), so much for mason work (at the mason booth), etc. This proved a great feature and gave exhibitors a chance to talk to their visitors, as well as giving visitors much useful information about building.

Why was it called the Housing-Living Exposition—why not merely a “building show”? Because “building show” is not broad gauge enough. Our show was a genuine education to all citizens—to show them how to build and live economically.

What does it cost to give a show? The income from the Oak Park show was approximately \$1,500 and this income just about pays the expenses. In other words a successful show can be depended upon to just about break even. It should not be considered as a com-

The Story of this “Own Your Home” Show—its Success Through Good Management and Enthusiasm—in a Small Community, Encourages Every Community no matter how small to press forward the “Own Your Home” Movement. What are YOU doing toward it?

been more time we would have “settled” a few more national issues.

In the afternoon of the Congress, school children had been gathered in the same hall for a Junior Congress and the resolutions passed by them were taken up, also, by the Senior Congress in the evening. This got them interested, and through them, their families. All this cost the Exposition Committee money, but it was of service to the town and helped to put the Building Show on the firm foundation of *public welfare* as it ought to be.

The “personal” ad on page 27 shows how we went right at the people and hit them between the eyes as much as possible. It appeared in the local papers and was addressed to well-known town leaders.

The illustrations tell the story of the booths. They were artistically arranged, divided by low railings so that when one entered the hall, a vacant

ordinary lights, only, and make them pay for extra lights and current, at cost (no profit).

Don’t be stingy with free tickets to exhibitors. Give them at least 100 each, to distribute to their patrons.

Don’t quit for one moment trying to increase the attendance at the show. Your exhibitors are paying for the privilege of showing their goods to a large number. It is up to you to see that they get a good audience, daily.

Don’t let your exhibitors boss you. Be kind but firm, and show them you know your business. Be absolutely square and impartial.

An idea which attracted many people to the show was a free set of plans of a Model House, costing about \$4,500. The plans were printed on a little circular and given to every visitor to the show. Going from booth to booth patrons could take the little plan along with them and find out at each exhibit

mercial proposition but merely as of help to citizens, just as the Public Library and the Public School System are of help.

Now, if you want to start business in your town, and help the United States Government and your citizens as well as yourselves there is nothing more patriotic or more useful you can do than get up a building show. Go right at it in a business-like way. Get the grocers, druggists and other merchants to back it as well as those engaged in the building trades, for remember a house owner is a better citizen than a non-house owner; all merchants benefit in the long run by the Own Your Home class. Be broad gauge. Don’t let petty jealousies creep into your management. Get a broad-minded chap to run your show, a fellow who can get the people in line and keep them there. Go to it, work hard, have a short show (not more than a week) and may luck attend you.

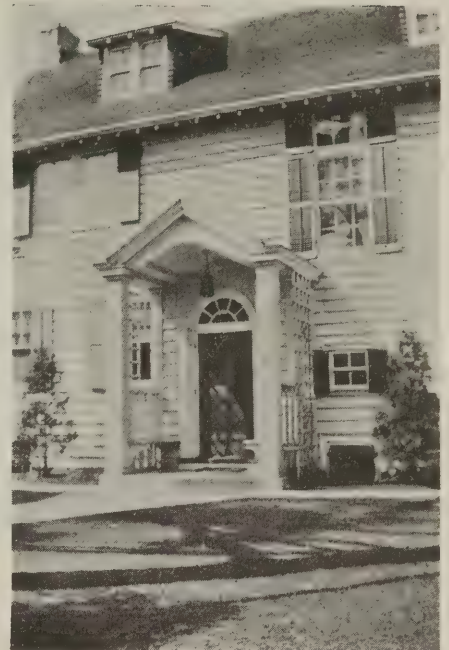
MODERN ENTRANCES



Number 1



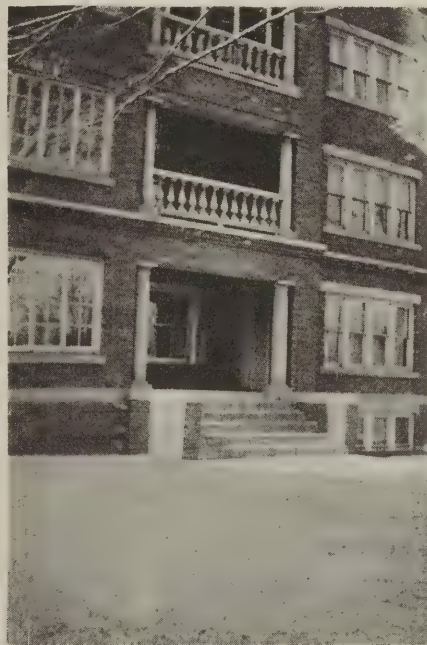
Number 2



Number 3



Number 4



Number 5



Number 6

No. 1—This type is an adaptation of the Colonial style. The ceiling is formed of white cement plaster which matches the white woodwork.

No. 2—A simple way to form a vestibule without disturbing the general plan of the house. The seats give an air of hospitality.

No. 3—The very slender wooden columns express the material that is used in their construction. The proportions that are proper for stone should not be used for wood.

No. 4—An effective treatment for a

house of moderate size. There is a wood trellis between the pier and the wall.

No. 5—An entrance to a large apartment house. Fire escapes are sometimes rendered less conspicuous by using a scheme similar to this.

No. 6—A combination of cement and stone that is easy to build. There is a flower box in the brick slab just under the three small windows.

No. 7—An entrance through the living porch sometimes works out well. The brick terrace binds the chimney to the brick wall of the porch.



Number 7



The illustration above gives an idea of the grouping. Most of the houses are of masonry, but frame ones are built here and there to prevent monotony.

THESE house plans help to prove the truth of the familiar saying, "simple things are best." Simple construction, simple plans, and simple designs, form a good policy to follow in building small houses (and large ones too, for that matter). Simple houses not only look better, but they keep the cost down and that is the big item in the construction of small houses.

Wherever possible, photographs are used as illustrations, as they give a true idea of the actual appearance of the houses, drawings are more artistic, but we all know how easily a clever draftsman can camouflage an ugly design. These photographs by no means exhaust the variety of designs that are used in this development; they were chosen at random and fail to include many of the other desirable types. They were made during construction and the planting of trees, shrubs, will of course make a great improvement in the appearance of the houses.

Study these houses carefully; the large number of designs allow plenty of choice and the pictures are full of practical suggestions that you can use in the next house that you build. Many of the houses are easily adaptable for either town or farm. See how simple the designs are, no frills, everything practical and yet how pleasing.

This development was

among the first of the large industrial housing schemes, in this country, to vary from the old method of building row upon row of houses each exactly like its neighbor; all of them having that peculiar staring look that goes with groups of houses of the same type. It was promoted by the Goodyear Tire & Rubber Company of Akron, Ohio, and up to the present time more than one thousand of the houses have been completed.

The development may be roughly divided into three groups. The first group, consisting of 350 houses, was begun in 1913 and completed in 1915; the second group, consisting of 663 houses was completed in 1918; and the third group, for which 800 houses are planned, is now under way.

The houses considered in this article are those of the second group. The

store buildings, churches, schools, athletic field, park, etc., are special features that will not be taken up at this time.

These typical houses range in size from 4 to 7 rooms; the large houses being designed with the idea of renting the spare rooms if desired and for this reason chimney flues are provided for light housekeeping in all bed rooms. The selling price of the houses, not including lot, etc., ranges from \$2,500 to \$4,000 and they are sold on a most liberal installment plan.

Almost all of the houses are of masonry construction and only a few frame ones were built in this group. Slate roofs are the rule although some asphalt shingled ones are used. The construction throughout is of the most durable quality and the requirements for workmanship and materials are rigid and exact. There's no skinning on this job.

The walls are of hollow tile finish with stucco or brick veneer. The walls below grade are of vitrified tile. The basements and porches have cement floors. The wood framing is of yellow pine. All of the houses are provided with modern plumbing, electric lights, and hot air furnaces.

The first floors are double with oak floors in the main rooms and hard pine in the others. The trim is of oak or gum and pine. The walls are fumed and plastered.



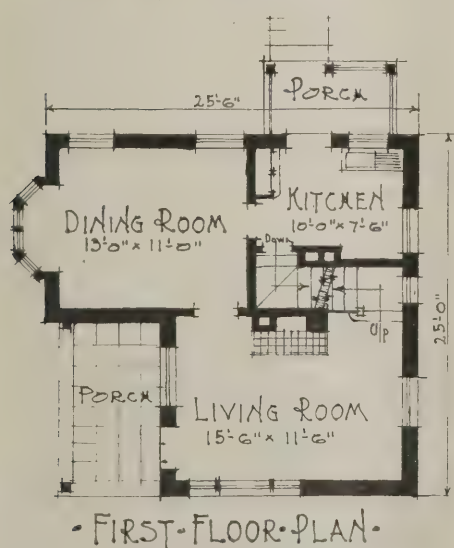
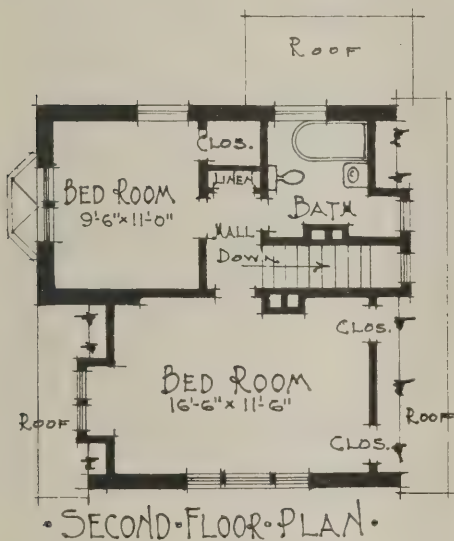
Simple details and good proportions are always pleasing. A "dolled up" house invites criticism.



We are always talking about developing an American style of architecture. We don't have to develop one, we always have it, our own American Colonial.



Shutters and flower boxes are little details that give personality to a house. Even an old house that is commonplace can often be redeemed by adding a few details of this sort.



The practical features of many of the plans have been found satisfactory after four or five years of use. A plan may appear ideal on paper, but a house must be lived in for some time before the arrangement can be said to be satisfactory.

The living rooms have French doors and the mantels, book cases, sideboards, and kitchen cupboards, are built in.

All of the details are handled in the simplest way and for that reason they are all the more attractive and inexpensive. A home should have a restful feeling. People who build "fussy" houses with an idea of attracting popular attention are ridiculed for their pains.

It is usually difficult to make large porches look well; improper arrangement and too many details often make

them so conspicuous that they stick out like sore thumbs. The reason that most of the porches of these houses are so successful is due to the extension of the main house roof to cover them, but even the porches that are placed at the gable ends do not have a detached feeling; they are carefully proportioned and detailed and seem to belong to the houses. The dormers are well handled and their slate sides blend with the roof and make them inconspicuous.

The overhang of the roofs at the gables is kept close to the walls. This



Everything about this house has an air of home. The bay window; the dormer; the good substantial roof, and the snug porch are all members of the family.

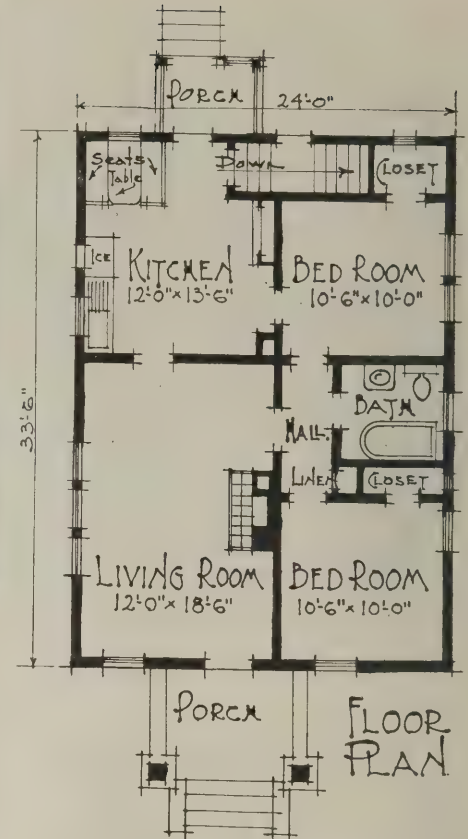


If this bungalow were half buried in flowers, someone would "shoot it" with a camera about every fifteen minutes. Bungalows and palm trees are usually out of place in cold climates.

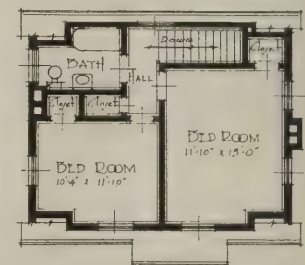
is a pleasing feature that should be used more often. Gables with wide overhangs usually serve no useful purpose on two-story houses, as the protection from sun and weather that they are supposed to offer is commonly more than offset by their cost and poor appearance. Wide eaves, however, are not open to this criticism. The use of small panes of glass adds at least twenty-five per cent to the looks of these houses. Large panes of glass are not suitable for small houses; they are "out of scale." The excuse that large panes are easier to

clean than are small ones is usually offered by a man who never in his life washed a window—ask a woman who has had experience with both kinds and nine times out of ten she will say that there isn't enough difference to count. And don't forget the small boy and the cost of replacing broken glass.

In building these houses the company has not imposed binding restrictions on the buyer's ideas as to what sort of home he must build. Most of the houses were designed by George H. Schwan, who is the architect for the develop-



The elimination of the dining-room in small houses is literally gaining ground throughout the country. People with small means want every inch of space to count.



• SECOND-FLOOR-PLAN •



• FIRST-FLOOR-PLAN •

Note that the plans of this house are shown reversed



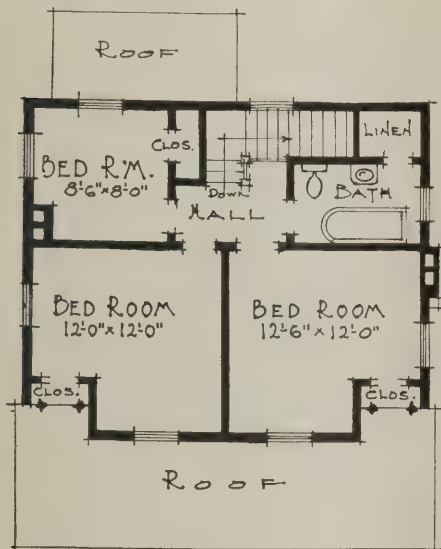
The smallest of houses can be given an air of simple dignity that makes "fussy" houses trail their feathers. Anyone could call this house "home."



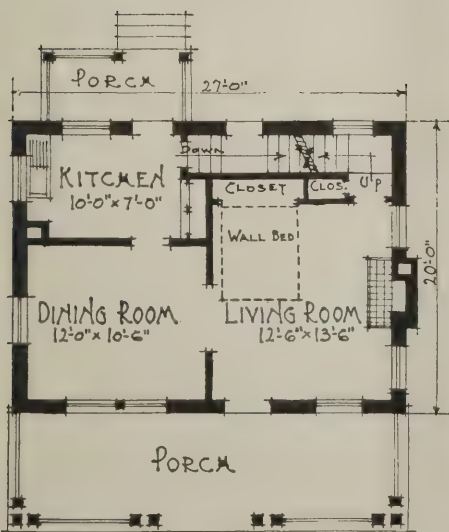
The stucco in the gable repeats that on the porch wall. This is a simple way to avoid monotony.



A sweeping roof line and a neat bay window are simple means of giving a homelike effect.



• SECOND FLOOR PLAN •



• FIRST FLOOR PLAN •

ment, but a buyer is free to submit his own plans if he so desires. These plans, of course being subject to approval by the architect. There is no difficulty in securing this approval, so long as the proposed house carries out the spirit of the group. The contracts are let to any responsible builder and the whole scheme is one of cooperation rather than restraint.

Builders will find these designs and plans full of suggestions. They represent the ideas of a great variety of per-

sons—their idea of a home. So in selecting a plan to suit a certain client the architect and builder has at his convenience these examples of finished, accepted structures, which he can use to get the point of view of his client and thus be enabled with greater certainty to “get him the first time.”

“A HOME BUILDING AND HOUSING” NUMBER OF NATIONAL BUILDER.

Responding to the national interest in housing and the demand for more homes



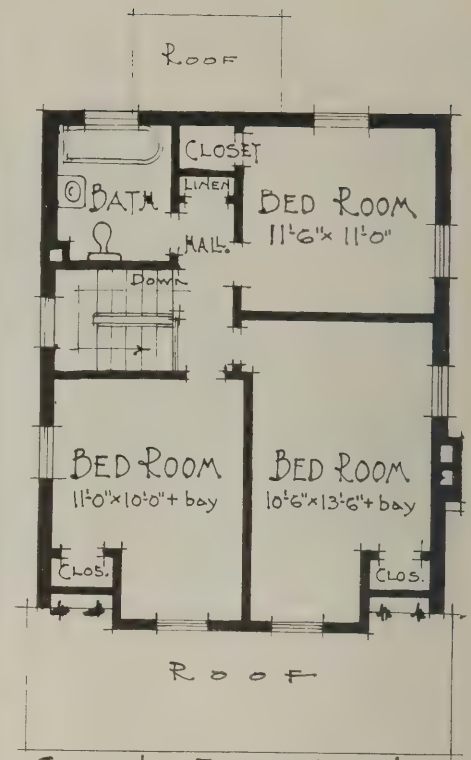
Many people like a full length porch, like this one; others would prefer to have a sun porch at one end, with French doors opening from the living room. Many of the houses have built-in beds. This gives them more capacity than the plans indicate and is a desirable feature for small houses. A bed of this sort is often equivalent to an extra room and needless to say the cost is much less.



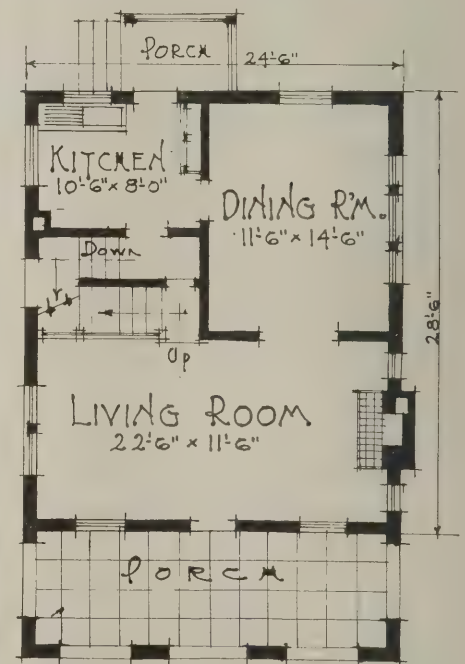
White stucco on the porch wall gives better light for the front rooms. It also alleviates the somewhat stiff effect of an all brick house.



These columns defy all of the proportions of the "classic" ones, but they have a substantial look that suits a home of this kind. This shows that rules for design cannot be blindly followed.



• SECOND FLOOR PLAN •

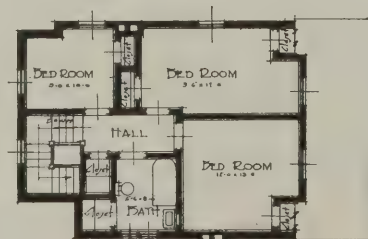


• FIRST FLOOR PLAN •

A simple plan is the first step toward an economical house. Almost all of these plans are simple rectangles without breaks, and the porches are usually contained under the main roof.



• FIRST FLOOR PLAN •



• SECOND FLOOR PLAN •

the July issue of NATIONAL BUILDER will feature exclusively "Home Building and Housing" construction.

Builders and architects who have photographs, plans, and details of successful home and housing construction are invited to contribute. Full credit will be given to all contributors.



A house may look well without trees, but trees improve the appearance of any house; they keep it from having that "new" look.



When you use half timber work keep it confined in small spaces like this. If it is spread all over a house it looks "fussy."



Brick trim gives life to a stucco wall. But don't carry this treatment too far. The best rule for these details is to always quit before you are through!



Wood construction for the gables is a money saver. It does away with the use of expensive lintels and the higher a brick wall is carried the faster its cost grows.



Every effort was made to preserve existing trees. A tree on a sunny side of a house has practical value; it cuts off a lot of heat in summer.



The raked out joints give the brick wall a texture that harmonizes with that of the stucco. These little things help to make a pleasing design.



Note the simple brackets for the verge board. Their appearance is much better than that of the clumsy brackets that are sometimes used for this purpose.



Properly mix a little stucco and a few bricks, garnish with a couple of wood trellises to a flower box, and you have a bungalow that young married folks can't resist.



Shingled gables and brick walls make a pleasing house; probably because both materials are in small units.



Brick, stucco and wood are combined to give the good proportions which make this house attractive.

The Invisible Hands

CONSIDER how many invisible hands are engaged on a new building. Every man that is employed on a building represents a half dozen other workers who supply him with materials. If five building tradesmen are employed, jobs are made for thirty other men at the producing and manufacturing end. At such a rate it won't take long to put every idle man back on the job.

Look at the pictures that precede and follow this page. These pictures represent a great many industries that make the materials that go into our houses. See how many you can think of that depend more or less on building construction to keep them going: Paper

It is figured that every man engaged on a building job makes work for six other men in providing the materials with which the builder works.

makers, tanners, weavers, surveyors—almost every line of business under the sun may be included.

This is why the national Government is paying so much attention to the immediate construction of homes, etc. The experts at Washington realize that the building of even a four-room bungalow is of sufficient importance to merit consideration. To overlook the influence of the small building as an aid to creating prosperity indicates a lack of vision that amounts to stupidity.

Get this view of it, builders, and talk it to your clients. Make it a prominent feature of your advertising.

The Quantity Bureau in America

ALL builders have probably heard of the quantity survey system of taking off quantities from plans, illustrated in the February and March issues of NATIONAL BUILDER. Most of you approve of it insofar as the theory of the system goes, but its actual application in America has received but scant publicity and you are somewhat in doubt as to its practical value in **your** work. You are not sure that such a scheme is possible in this country nor that it is adaptable to our methods.

You may not know that there are now several professional Quantity Surveyors in independent practice in this country and that there are a score or more of quantity survey bureaus maintained by as many different associations connected with the building trades.

Started in England

A brief description of the quantity survey system as practiced abroad will refresh your memory and prepare you for the description of the adapted methods now used in America. The system probably originated in England and it has spread from there to Scotland, Ireland, Australia, France, Germany, and South Africa, and within the past ten years to America.

Wherever the system has gained a foothold it has crowded out the old haphazard methods of "guesstimating." In England the Quantity Surveyor is a professional man who devotes his entire time to the practice of his profession. He is a highly trained expert who takes off the quantities from the plans. He lists every single solitary item that goes into the work; he goes through a plan with a fine toothed comb and nothing escapes him. He can't afford to *guess*, he must *know*! His professional standing depends on the reliability of his lists of materials. This makes him careful and exacting and if the specifications are vague or if the plans are not definite he immediately calls on the designer for a clear explanation. Thus the doubtful points are taken care of before the work is begun and while the designer remembers just what he intended to do. The long list of "extras" is reduced to an almost negligible quantity and the many disputes growing out of them are avoided.

The Profession of Quantity Surveying

In general, the professional Quantity Surveyor in this country follows out the methods used abroad. That is, he is a professional man just as the architect or builder is. The extension of this new

profession to builders in general is highly problemetical and it is doubtful if its services will ever be available outside of the larger cities. On the other hand, the success of quantity survey bureaus as established by builders' organizations is practically assured, even in small communities.

In establishing such a bureau the first thing to be done is to get together. This means that an association must be

competitors actually working together to solve some particularly difficult problem.

Establishing a Bureau

From the very first it must be understood that in forming a quantity survey bureau, every member must do all in his power to make it efficient. Each individual must lay bare his so-called "trade-secrets." He must give the bureau every advantage to assure its success.

The Objectors

It is often difficult to persuade a man who has built up what he considers to be an efficient method of estimating, that he will derive any benefit from allowing his competitors to use his knowledge of taking off quantities. He argues that it is this very thing that makes him successful and that if he puts them next to his methods he will lose his advantage. This argument is not only selfish and narrow, but it is shallow. We all know that most of the failures among builders are due to faulty methods of estimating. A man may be honest and a crackerjack when it comes to handling the work in the field, but he is weak on taking off quantities from the plans. He "guesstimates" on a job; often lands it for that reason; and sooner or later goes broke. In the meanwhile, the man who has the efficient method of estimating but didn't get the work because his competitor guessed wrong has plenty of time to sit around and figure out how much it cost him to bid on that job.

Fairer Competition

If each of these men had based his bid on the same lists of materials, there would have been fairer competition, based on true values and neither would have suffered any great loss. Another thing, the man who prides himself on his superior knowledge of estimating may be fooling himself. It is rather easy for some people to consider that they have a monopoly on all of the trade secrets and that nobody can tell them anything. These persons often find that the very secrets that they guard so carefully are "old stuff" to their competitors and have long been discarded for more accurate methods. It is pretty hard to find anyone who can't tell us something new these days.

The Outsider

Another objection that has been raised is that it gives outsiders a chance to come in and bid on work that rightfully belongs to another community and lays

□□□□□□□□□□

The
Quantity Survey
Means
Knowing What
You Have
to Figure on
Instead
of Guessing
at it

□□□□□□□□□□

formed. This organization must be a permanent one, and a live one. Regular meetings should be held and the meetings should be devoted to discussions of the problems in hand. We have lately found that competition doesn't mean that we are to stand alone and make all of our moves in secret. We have found that we are the gainers by associating with men who are attempting to solve the same problems that we are working on. This sort of an association isn't a far-fetched dream, it is a present reality that has been proven wholly practicable. In those that are operating today you will find members who are the liveliest of

all of the figures open to the inspection of outsiders and places them on an equal footing that is unfair to the local builders who have built up the system.

By the very nature of things this is no more true of the new system than of the old one. The only thing that there is of common access is the bill of material. The cost of the material and the labor of placing it is still on a competitive basis. The outsider will have no more knowledge of your methods of arriving at costs than your associates in the bureau. But to remove this bone of contention, there is no reason why a non-member should be given the lists of quantities. Let the outsiders "guesstimate" in the usual manner. But, be careful, he may "guesstimate" too low and land the job because he failed to include everything. This is a ticklish point that should be carefully considered.

Bureaus at Work

As a practical working example of how these bureaus are conducted two of those now successfully operating in Milwaukee, Wis., will be discussed. One is the Millwork Bureau, the other is the Concrete Builders' Bureau. Each has been operating for more than six years and is thoroughly established. The success of these bureaus is entirely due to the cooperation of the members. They are more enthusiastic today than when they were established. This is shown by the attendance at their weekly din-

ners which averages 85% of the total membership. At these dinners every man strives to outdo his neighbor in doing his bit toward helping the other fellow. Criticism is strictly taboo unless a remedy for the evil accompanies it.

The Cost of the Bureau

The actual operation of these bureaus is comparatively simple; the plans are delivered to the bureau and turned over to an expert estimator. This estimator has nothing to think about except his bill of materials; all of his time is given to estimating. He lists the quantities and checks and rechecks his estimates until he is sure that they are correct. Uniform lists of the materials are then prepared and given to the bidders. Only those bidders who present written orders from the owner or architect are entitled to receive the lists. No member of the association is allowed in the estimator room at any time. This rule is to prevent members from knowing just what jobs are being estimated. In the Concrete Builders' Bureau the cost of estimating is based on the percentage of cost of the material: 1% on jobs running below \$50,000.00 and ½ of 1% on those above \$50,000.00; this fee being paid by the successful bidder and any surplus remaining at the end of the year is returned to the members.

In the Millwork Bureau the cost of maintaining the bureau is charged to the members at the end of a certain period of time and the amount each

member pays is based on the amount of work that he does during that period. The two methods amount to practically the same thing. The members pay for what they get and no more.

Summary of Advantages

A summary of the advantages of the quantity survey system includes these points:

1. The cost of estimating is reduced by doing away with a duplication of work.
2. The man who gets the job pays for the estimate. The unsuccessful bidders are put to only a fraction of the expense that now prevails.
3. The bidding is on a true competitive basis and the gambling feature is almost eliminated.
4. The estimates are far more reliable, as much more time and study can be given to them.
5. The plans and specifications are rendered more exact as the designer is called on for explanations of any doubtful points before the contract is let.
6. The lists may be used in accurately determining the amounts of payments due on certificates and in adjusting the prices for added or omitted work.
7. Builders have more time to spend on work instead of being in the office figuring jobs.
8. The "skinner" is forced to bid on exactly the same terms as his honest brothers.

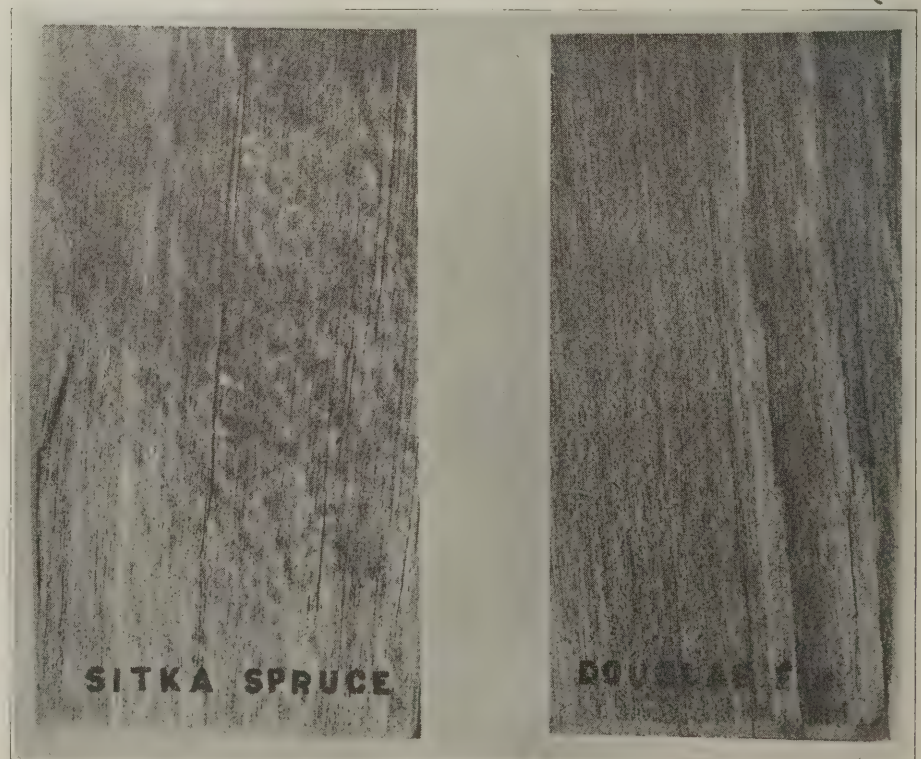
Douglas Fir and Sitka Spruce

DOUGLAS fir and Sitka spruce are very similar in appearance, but as the former is somewhat stronger, it is desirable to be able to tell one from the other.

In Douglas fir the difference between the springwood and the summerwood and between the sapwood and the heartwood is quite pronounced. This is what gives it the striking "grain" to which it owes much of its popularity for interior finish. It is heavier than the spruce, due to the much greater amount of resin which it contains.

Sitka spruce is more even in color; contains very little resin; is usually lighter in color and weight. The contrast between heartwood and sapwood is not so evident and it has a more "silky" appearance.

A characteristic that is usually found in Sitka spruce, but never in Douglas fir is illustrated by the photograph. It will be noticed that the former wood has a sort of dimpled appearance. This characteristic may be displayed by splitting along the rings.



Modern Four-Room Schoolhouse in England

By John Y. Dunlop

THIS ENGLISH school is built with a verandah running right across the entrance doors to the various apartments with the result that the ends of the class-room are all external walls. The object being to obtain thorough cross ventilation and the maximum

All the external walls are hollow; $4\frac{1}{2}$ inch outer thickness, a $2\frac{1}{4}$ -inch air space and a $4\frac{1}{2}$ -inch inner skin.

The two thicknesses are tied with metal ties and immediately under the roof projection the top of the wall is made solid.

sills and at the sides of the windows.

Above the level of the windows the gable is of frame construction, covered with flat tiles.

The chimney from the boiler room is built of 9-inch brick work with a $4\frac{1}{2}$ fire clay brick lining.



A MODERN ENGLISH SCHOOL HOUSE OF A NEW TYPE

amount of light and sunshine. This school is designed to accommodate 50 pupils to a room or 200 pupils in all.

The architect builder whose designs of a school is a success is to my mind a practical educator.

The type of building which is shown is considered in England to be on the right lines for a small school.

Walls

The walls of this school are built of local brick, faced with a machine pressed red brick and blue plinth.

In the drawing of the class-room roof a section of one of the walls is shown.

This is built on a concrete foundation with two courses of brick footing and a $4\frac{1}{2}$ -inch offset in the inside to form a rest for the class-room joists.

The walls are built solid until the level of the damp course is reached. There the outer and inner thicknesses are set $2\frac{1}{4}$ inches apart.

The gable walls, forming the sides of the class-room, with their numerous window openings, are hollow below the

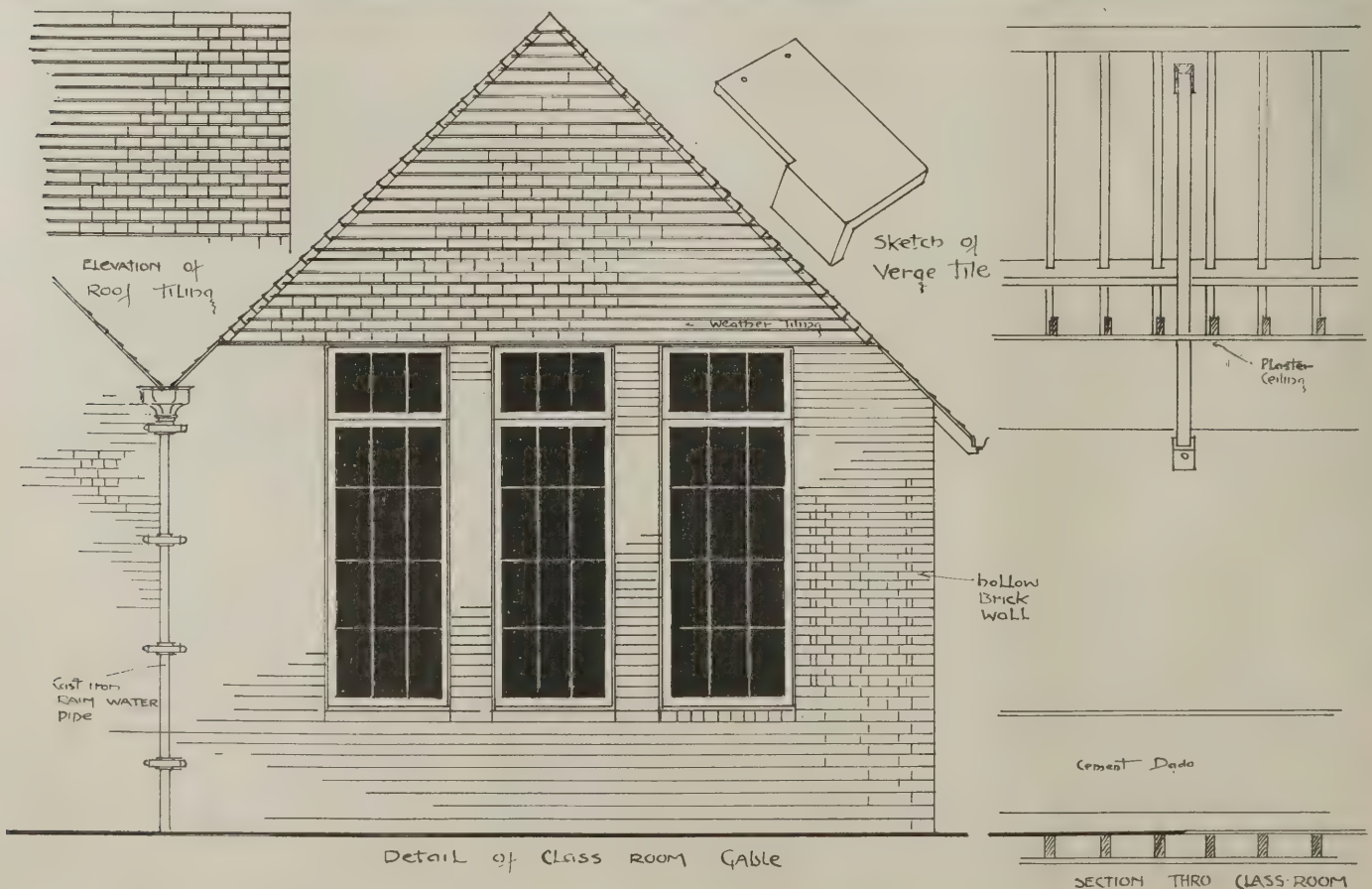
The children's toilet rooms are all built outside of the school building and consist of 9-inch brick with $4\frac{1}{2}$ division walls between the closets. The outer part of these walls are in harmony with the school walls while the inner $4\frac{1}{2}$ inches and division wall are brown glazed brick.

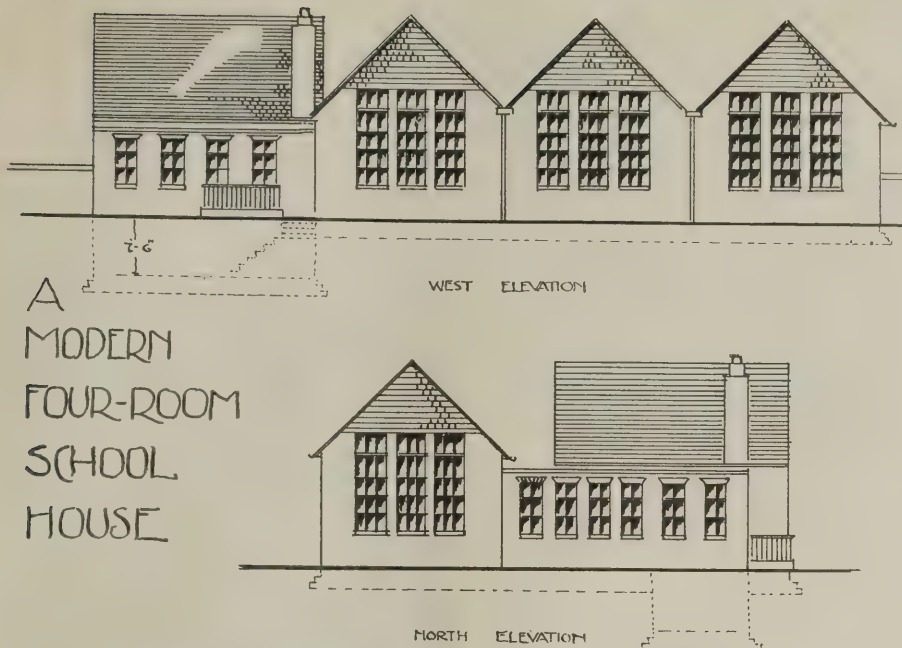
In this school there are no outside play sheds the verandah space taking their place.

This verandah shelter is constructed with steel stanchions fixed to concrete



ONE OF THE CLASSROOMS OF A MODERN ENGLISH SCHOOL
 The light comes from both sides in this room, a condition which
 American practice avoids





foundation. The roof is of reinforced concrete covered with asphalt.

Roofing

The roof over each class-room might be called a trussed roof as it has one composite truss in each room.

This as shown in the line drawing consists of two iron shoes which receive the principal rafters; the tie rod and the apex piece which receives the rafters and the king rod.

These trusses are placed exactly in the middle of the room so that one end of the purlins rest on the gable walls.

This construction gives a level ceiling with a slight splay to meet the wall plaster on each side.

The roof tiles are simple, oblong in shape and are laid to a gauge of $3\frac{1}{2}$ inches.

The shingle tiles used to complete the gables are hung on shingle laths in much the same way as roof slate is laid.

The line of the weather tiling is kept slightly in from the finish of the end of the roof. This is to allow the special verge tile which is shown in the line drawing to lap over the wall tiling and thus make a tight front between the sloping tile and the wall tiling.

The eave conductors are of cast iron and the valleys are made of sheet lead. These gutters have a fall to the outside of $1\frac{1}{2}$ inches to the 10 feet and are laid in two sheets, the lead extending up the slope of the roof to a height of 6 inches.

The junction of the two sheets is made watertight by a roll piece in wood 2 inches high and $1\frac{1}{2}$ inches thick and each length of lead is turned over the roll and wrought up the sloping sides of the roof.

The roof over the cloak room and teachers' room is reinforced concrete

covered with asphalt laid with a gradient towards the rain water pipe on the north wall.

All the rain water pipes are on the external walls and are connected to the drainage system which is carried round the school.

Floors

The floor in the cloak room which rests on solid ground is finished with wood

block bottomed with rough stone under concrete, over which a fine coat of cement was floated and troweled preparatory to the laying of the wood block.

The floor of the store and teachers room is also of concrete but in this case with the boiler house below it is of reinforced concrete but laid practically to the same level and also finished in wood blocks, 9 inches by 3 inches on the face, laid to a herringbone pattern.

The blocks were laid in melted pitch on the dry surface of the cement work. The pitch was well squeezed into the grooves of the blocks and the floor planed when laid.

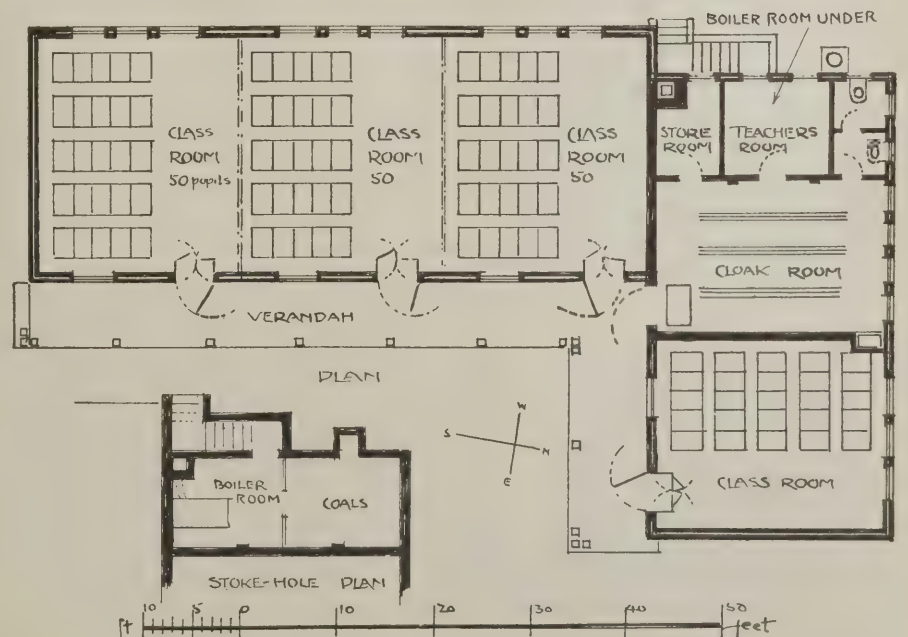
In the class-room the floors are covered with floor boards laid on wood joists, a section of which is shown in the line drawing.

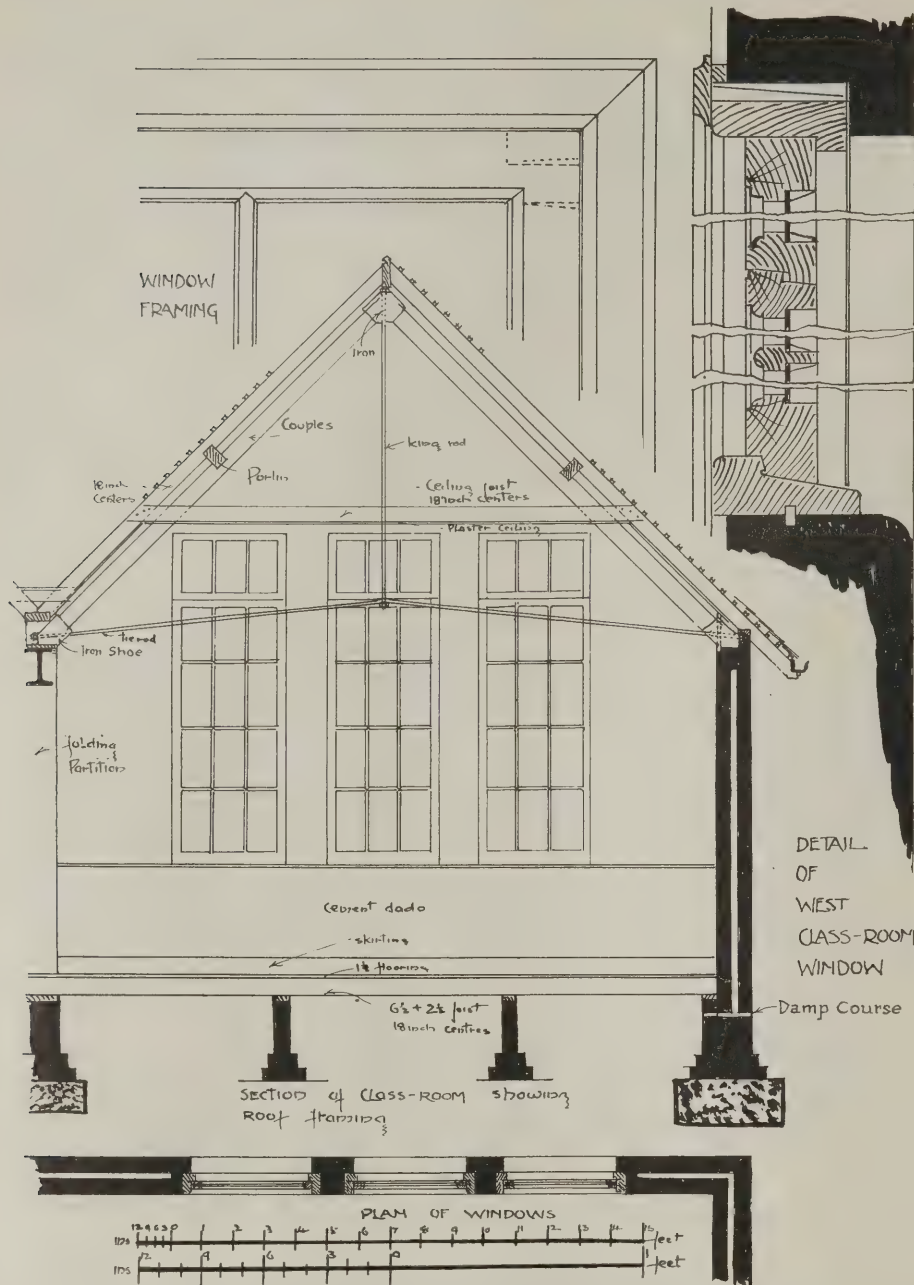
At the junction of the floor and wall finish a $2\frac{1}{2}$ -inch by $2\frac{1}{2}$ -inch hollow round base is laid in each room.

This member is grooved to receive the floor boards and is also grooved on the top edge to form a key for the cement finish of the lower part of the walls.

Underneath the floor, to exclude the ground air, the ground space is covered with a layer of tar laid on an even bottoming of small stones.

In the verandah and the basement the floors are of cement finished with granite chips to give durability.





Plastering

The ceiling and upper parts of the walls of class-rooms, etc., are all coated with ordinary lime and sand plaster on wood lath in three coats, the last coat being finished with a steel trowel, giving a smooth surface.

The lower parts of the class-room walls are finished with cement.

Windows

It will be noted that the lighting on both sides of the rooms is not in accord with American opinion.

The gable windows in the east elevation and the long windows in the west elevation are in two sashes but they are both in the same line and are arranged so that the top part opens in like a pivoted sash.

In pulling the top edge of the sash

forward the bottom sash is drawn slightly upward with the result that when the top part is fully open the long sash at the bottom has been lifted upwards five inches.

The air coming in at the sill is thrown into the hopper screens and is shot upwards into the class-room.

The only disadvantage in this pattern of sash window is that you cannot open the top part without slightly lifting the bottom sash.

Partitions

Three of the class-rooms are divided by two folding partitions. These are hung on track rails which are fixed to the steel beams supporting the roof.

The whole partition is arranged in six leaves hung together with brass edge hinges.

When the partition is extended into

position each leaf is fixed by a flush slip bolt, which is inserted into the floor.

Doors

The doors to the class-rooms consist of an outer glass door and double action doors in the inside.

The vestibule, formed to receive the folding doors, is built entirely of wood



with a wood ceiling, and projects into the class-room as will be seen in the halftone illustration.

In the cloak room the fittings are in metal. The posts supporting the hook rail are of malleable tube and the rails are of the same section connected with tee coupling screwed at the joints. The hooks are clamped together in pairs.

A low pressure hot water heater system is used.

The cost of a building of this type is about ten pounds per scholar or about \$96,000.

SECURING IRON WORK TO MASONRY

When iron work is let into masonry sulphur or lead is often used to secure it in position. The sulphur or lead is melted and poured around the iron which is let into the masonry. Tests seem to show that Portland cement mortar, mixed neat, is considerably superior to either when used for this purpose. It makes a stronger joint, is easier to handle and preserves the metal from corrosion. Threading or burring the ends of the metal does not seem to increase the holding power of the cement to any extent.

American Colonial Houses

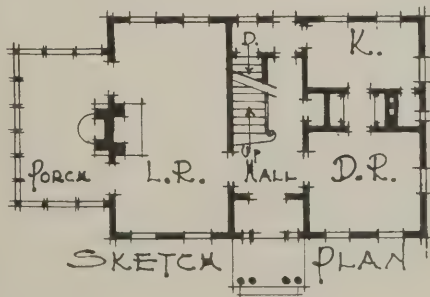


The American Colonial style grew out of the requirements of our forefathers for a house that combined an "open" plan with simple construction. The sketch plan indicates the characteristics upon which the design of a modern colonial house is based. It is extremely simple; a wide stair hall extends through the center of the building and is flanked by the living room and the dining room. The bed rooms are on the second floor—usually one in each corner, with the bath room over the front of the hall below. The living porch is a modern development.



All of these houses show the influence of the Colonial style, but the designs shown at the right are not of as pure type as those shown at the left.

In planning houses in this style it is safer to keep the entrance exactly in the center of the building. Sometimes the entrance can be placed to one side without bad effect, but it is usually better to use another style for the exterior design if you **must** have an entrance off center.



Some Electric Conveniences Women Want Contractors to Provide

By Elizabeth Whipple

IT isn't the man who keeps house—it's the woman. It isn't the husband who spends most of his time there nor the father who has to do most with the different features of the household equip-

We wear much the same kind of clothes, all of us. They must be washed, dried and ironed, and a system of washing and ironing which successfully copes with the problem in one house is about

apartments where it is the desire of the owner to give his wife the benefit of every essential labor saving device she needs in going about her tasks, day by day.

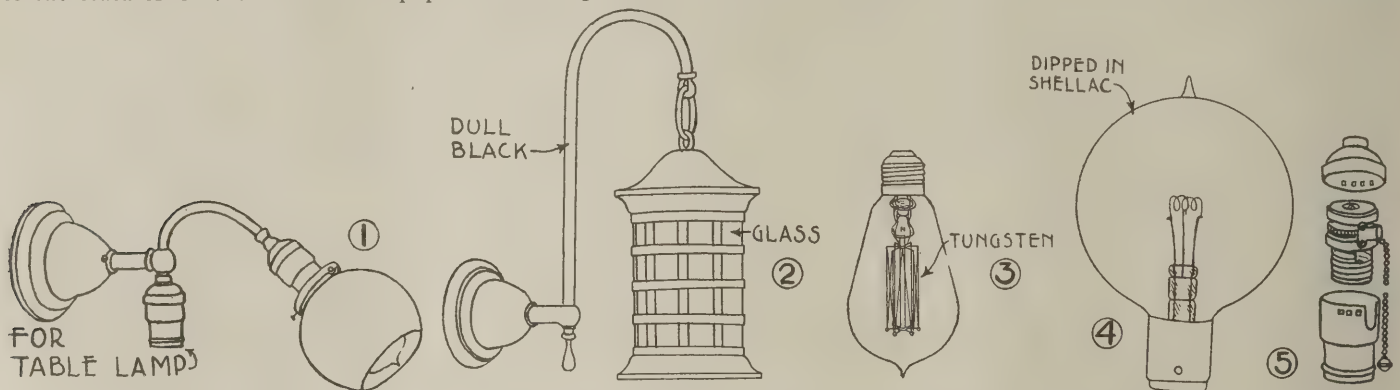


Fig. 1—When a table is to stand nearby a wall bracket it is a good idea to have an extra socket attached to the fixture like this, for a table lamp. Contractors can call the attention of their customers to little conveniences like this.

Fig. 2—A hall bracket of dull black metal. This is also a good fixture for a porch.

Fig. 3—Impress it upon your customers that it pays to use Tungsten lamps because so much current is saved.

Fig. 4—You can use bare lamps in bracket fixtures (without shades) if you dip them in shellac so they will not irritate the eyes with too much brilliance. "Turnip" lamps are good for this purpose.

Fig. 5—The "pull-chain" socket is a convenience greatly appreciated by women, because even short women can turn lights on and off without reaching.

ment, but the wife and mother who, whether she does her own work or hires it done by servants, is dependent for her everyday comfort upon the quality and details of every labor-saving device the house contains. If there are no labor-saving devices or if the little electrical housekeeping "helps" are not provided in sufficient detail, it's the woman who suffers most; or if they are poorly placed or of impracticable design.

There is more detail about a home ruled by woman than there is in an office or factory ruled by man. Many offices contain nothing more necessary than a roll-top desk, a couple of chairs, a rug, a waste basket and a calendar; but not so the home which must have a sufficient amount of apparatus to make it possible to do the work required.

The difference between old-fashioned uncomfortable homes and modern, comfortable ones is largely a matter of a more convenient arrangement of rooms and more adequate provision of apparatus in the latter. We all live in pretty much the same way, eat nearly the same kind of food, cooked and served in about the same manner. All modern houses are heated and lighted, scrubbed, cleaned and dusted in about the same manner.

what is wanted in every other house.

So modern housekeeping has been systematized by experts and we know and can plan for electrical equipment that is now standard in all houses and

ELECTRIFYING THE HOME See Next Page

1—Note the concealed sockets for movable lamp stands.

2—A decorative wall light.

3—A wall sconce.

4—Note the center and wall lights, coffee percolator, table lamp, and know that wall and floor outlets must be provided for these.

5—A combination of direct and indirect lighting.

6—Center lights, mantel lights, and table lamps require outlets conveniently and unobtrusively placed.

7—Entrance lights harmonizing with entrance design.

8—A simple, effective and economical door light.

9—The large indirect light casts a soft radiance through the room.

10—An effectively placed entrance light.

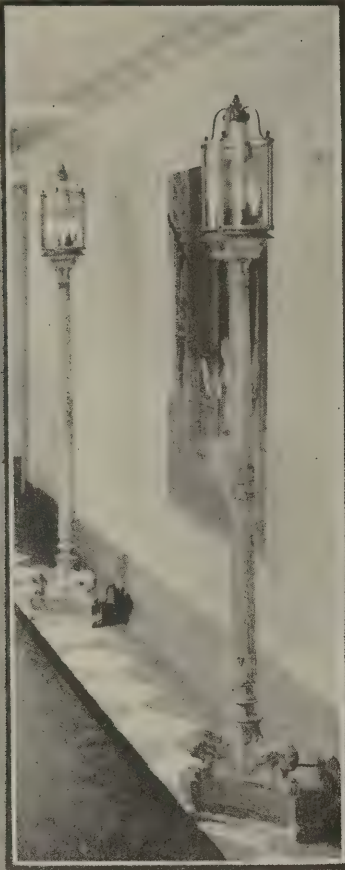
Lights, Switches and Plugs

The successful electric lighting of the house is largely a matter of having plenty of outlets, located in the proper places. You contractors who build so many houses should see that electric lighting, which contributes so directly to the comfort of the housewife, is properly considered.

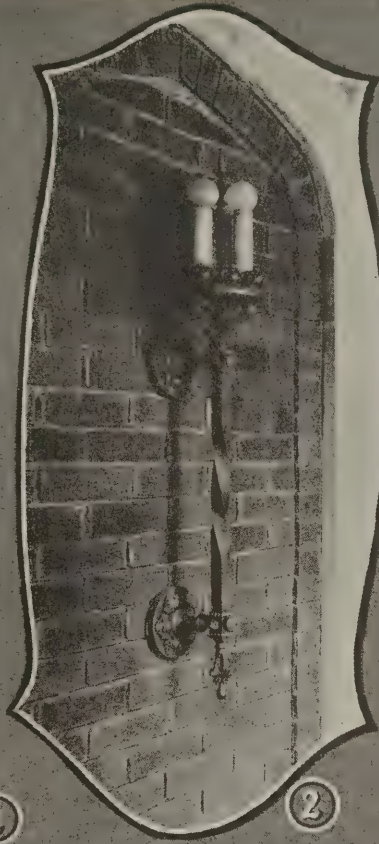
Most people make the mistake of putting in too few outlets in the first place. Isn't it so? Did you ever see a house built in which the wife didn't wish she had more outlets? Architects and builders should go over the location of all outlets carefully with their customers, especially with the woman of the house, for she is the one who suffers most from inconvenient location of electric outlets.

Right outside the front door there should be a light; either an outdoor bracket or a lantern, for no woman wants to go to the front door at night unless it is well lighted up. While you are about it put a light at the back door, also. Back doors are usually gloomy places; light them up and have glass in your outside doors so you can look out and see who is there.

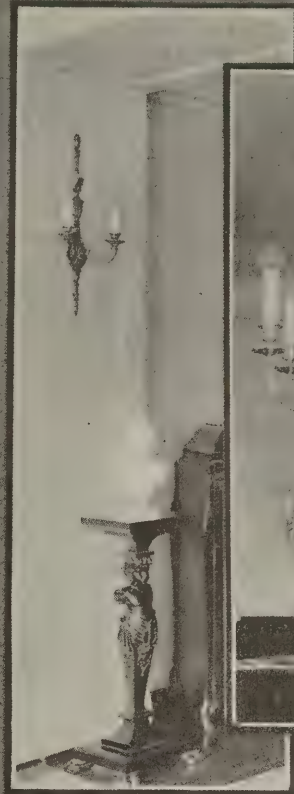
If the front door is of glass, as it often is, perhaps a light in the vestibule.



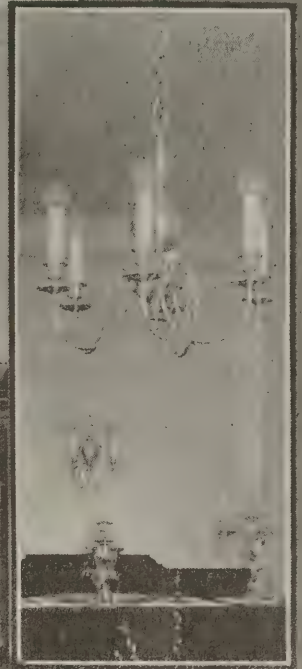
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2



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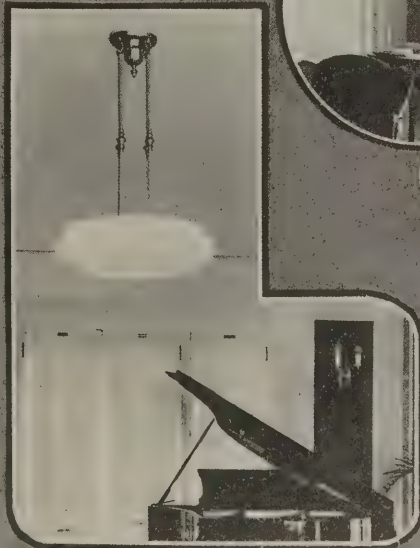
6



7



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9



10

shining out through the door may make an outside light unnecessary. Outside lights, of course, should be on switches located near the door.

This matter of switches is of extreme importance; the kind of material they are made from, and their location. If there are several switches in a single room put them all together if possible in what you contractors know as a "gang switch." Thus, in the living room, you should have a gang composed of several switches, one operating the exterior or porch light, another operating the living room ceiling light, another the hall light, and so on. This group of switches should be put in plain sight near a door casing, where you would expect to find it; not hidden away behind a door where nobody would think of looking. When you are dealing with switches it isn't a game of "button, button, who's got the button" if you really want to avoid inconvenience in finding your switches. They should be placed where strangers, even, can quickly find them.

The right kind of switches are always push button types and if you really want to make a hit with women, have switches plated to match the hardware.

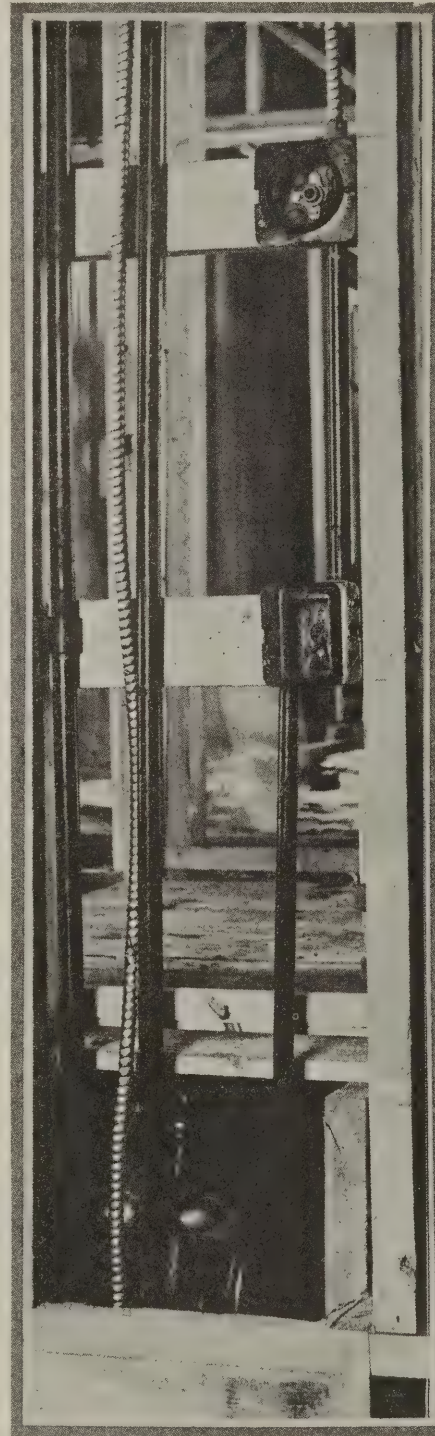
The arrangement of outlets in the various rooms is merely a matter of practical knowledge on the part of the contractor and I'll venture to say that most of the knowledge a man gets on electrical arrangements he gets from experience in his own home. Most of his experience is, sad to relate, the result of what he has learned from the inconvenience of his own house; learning from this experience he is in a better position to make other houses more convenient.

A well lighted living room usually has a center chandelier and a number of side brackets where most needed, but often the center outlet is left out and some extra side brackets or floor plugs substituted. There should be two or three floor or wall plugs. Wall plugs are excellent and I have found a good location is in the plaster just above the baseboard instead of down nearer the floor **through the baseboard**. Eighteen inches above the floor is standard with some architects, I believe.

When preparing to wire a building, contractors, consult the mistress of the house in advance. Find out from her where her tables are to go and she will then tell you whether she wants wall plugs (for tables close to a wall) or floor plugs (for tables out in the floor). There should be a plug behind the davenport so a floor lamp can stand there to shed light over the shoulder of a reader in this comfortable spot. A floor or wall receptacle is also necessary for the floor lamp now so often used with the piano or victrola.

In many modern homes there are little receptacles on the mantel shelf for pretty little candle-lamps with silk shades. They are very decorative and thus dear to the hearts of women.

Now when you come to the kitchen approach this most essential department of the house with all due respect, and



Ordinary conduit is shown in this illustration, just as it should be placed in the walls before plastering. Below is a box ready to receive the switch; above is a junction box ready to have the electric light bracket attached. Note also the flexible metal conduit which is frequently used for crooked runs, as it bends so readily.

give it plenty of study, contractors. Did you ever see a kitchen in which the electric outlets are really right? Perhaps, but more often you have seen kitchens where everything is radically wrong.

There should be a central light in the ceiling controlled by a switch placed where the mistress of the kitchen can quickly find it in the dark. There should be a bracket or drop light right over the sink and another over the range, unless the aforesaid central light amply illuminates the situation. These latter lights need no switch but can be turned on by hand.

In the kitchen, near the kitchen table should be a plug to which the bread toaster can be attached, and often, a plug like this is placed under the dining room table for the same purpose. When you go into a house and see electric cords attached to lighting sockets hit-or-miss all over the house, you may know that the electric equipment was poorly considered. There should be a receptacle for every plug required.

If the ironing is done in the kitchen the plug for the toaster can be used for the electric iron, for no woman ever uses anything but an electric iron when she can get electricity. If there is an electric range, there should be an electrical connection here, also.

On the basement stairs, or just at the foot if the stairs there will be a light controlled from the kitchen, for it is much more comfortable for the housewife to go down these stairs one step at a time than to fall headlong "all at once" as sometimes happens on dark stairs.

In the laundry there should be a ceiling light for general illumination controlled by a switch, and other outlets operated by hand. Over the tubs will be a light, of course, with another near the ironing table for dark days. Then there should be a plug for the electric washing machine now considered essential to the welfare of every home. Another plug is provided for the electric iron.

It has been my experience that laundry tubs should stand out in the center of the laundry floor, or at least, a couple of feet out from the wall. In this case it is difficult to use a wall plug for the washing machine, as the latter stands just in front of the tubs. To overcome this I have seen an electric light socket used hanging down from the ceiling, into which the line of the electric washer and wringer is plugged.

There are many places where that little convenience of great comfort, the "cluster socket" can be used to great advantage. This is a little porcelain and brass socket which screws into an ordinary lighting socket when you want to get more than one outlet. In the sides of

the "cluster" are one, two, three or more sockets in which you can screw lamps or plugs. Thus, over the laundry tubs you might screw a "cluster" into the single ceiling socket, said cluster to contain **two** sockets—one for a lamp and one for the washing machine plug.

How many little women have worn themselves out trying to reach up to turn the keys of lights so far above their heads? Put pull-chains sockets in your houses, contractors, and everybody can operate them, tall or short. Standard height for wall brackets is about 5 feet 6 inches high from the floor, though it makes some difference whether the brackets are to point up or down.

One very clever switch I have seen for electric toasters, flat irons and other power outlets, has a little red bulls-eye in the center, lighted by a tiny lamp in the switch receptacle. When the power is on the red light glows, so no one except a blind woman could go away and carelessly leave the power turned on, because the red light quickly attracts attention and reminds one to turn off the current. Some women have been known to burn the house down by leaving the current going in an electric iron standing on the table.

In a bath room there are two ways of lighting—by brackets or a ceiling light. One very good way is to drop a light right over the wash bowl in front of the mirror; a single light hung in this manner makes good light for shaving; otherwise, a bracket on each side of the mirror should be provided (for shaving). At least one light in the bath room should be controlled by a switch, handy to find in the dark.

Never put a switch or any electric fixture where it can be reached from a bath tub. People standing in water in a bath tub have been known to be electrocuted by reaching up and touching an electric fixture. A sudden short circuit in the fixture grounds instantly through the water in the tub and may at any time give a bad shock.

In a bed room there should be a central ceiling light for general illumination, controlled just inside the door. At the dresser you may have two brackets, one on each side (to light up the mirror) or another way is to drop a light down from the ceiling, just over the dresser.

If you
Can see a House
through a
Woman's Eyes,
Mr. Builder,
You will Know
that an
Oversupply of
Electric Openings
Rather than
Too Few
Make the House
More Desirable,
Easier Rented
and Easier Sold

Either in a bed room or bath room there should be a plug for a curling iron. There should be a wall or floor plug at the bed so a table may be placed there with a lamp, for reading. This is fine for an invalid to say nothing of healthy people.

There are several kinds of plugs. Floor receptacles should be let clear into the floor so that when the plug is inserted and the cover closed the top of the box will be flush with the floor. Thus you would never trip over them when rugs are taken up for dancing. One good kind made for this purpose consists of a porcelain plug inserted in a receptacle leaving a little hole in the twin covers through which the cord comes. These make good wall plugs, also. Another kind of wall plug has a receptacle which is flush with the wall, containing two little slots into which the two prongs of the plug fit.

Don't put any more door bells in with a battery, contractors; urge your customers to have a **real** door bell outfit in which the current is furnished from the lighting circuit by means of a "transformer". Some electrical contractors give this outfit, free, with every job in order to bid for popular business.

It pays to use tungsten lamps because you get more light for less money though the lamps, themselves, cost more than ordinary carbon filament lamps, so you should recommend them to your customers. Where you have a big room to light it might even pay to use nitrogen lamps. The tungsten lamps are now marketed under trade-names. The 60 watt size are about right for brackets and 80 watt size for most ceiling outlets.

Wires in the country are still run by means of porcelain "knobs and tubes" but of course conduit is very much better and the only really safe way. After a number of years the insulation on wires rots and disintegrates. Pretty soon the wire is bare and when two of them sag a little and nearly touch there is suddenly a little flash, and sparks fly in the dry, dusty partition. Thousands of disastrous fires have been started in just this way—fires which would never have started if wiring had all been done in conduit.

Plywood For Exterior Work

The possibilities of using plywood for exterior woodwork such as doors, garden furniture, and work in which durability and strength must be combined with lightness of weight is suggested by the results of experiments and research work conducted by the Forest Products Laboratory of the U. S. Forest Service at Madison, Wisconsin.

Many thousands of tests were made by the laboratory for the purpose of

obtaining data for the use of plywood in airplane construction. The results of these tests are now available and will no doubt stimulate the use of plywood to a marked extent. Plywood is built up of thin sheets of wood glued together so that the grain of each sheet crosses that of the ones next to it. Twenty-five or thirty sheets are sometimes used to make a piece of plywood one inch thick. It has great strength in all directions;

shrinks or expands but slightly and is easily worked.

Its use as veneers for interior finish has long been practicable, but until the development of the new water-resistant glues its use for exterior work has not been seriously considered.

These new glues are so water-resistant that plywood made with them can be boiled in water for a day without showing any signs of separation.

Notes on Concrete

CONCRETE may be considered a small scale imitation of rubble stonework. The stone and gravel in concrete represent the rubble stones, and the sand and cement represent the mortar. This similarity becomes more evident when concrete is examined under a high power magnifying glass—see Fig. 1.

The strength of rubble stonework relies to a great extent on the bond stones that tie it together. Bond stones in concrete are impracticable, however, and for strength it must rely almost entirely on the natural bond between the materials of which it is made. If the aggregate is dirty, the adhesion between the mortar (sand and cement) and the coarse aggregate (stones and gravel) is reduced and for a given strength, more

through the screen while the cleaned gravel passes over it and falls out of the end of the trough.



Gravel Streaks

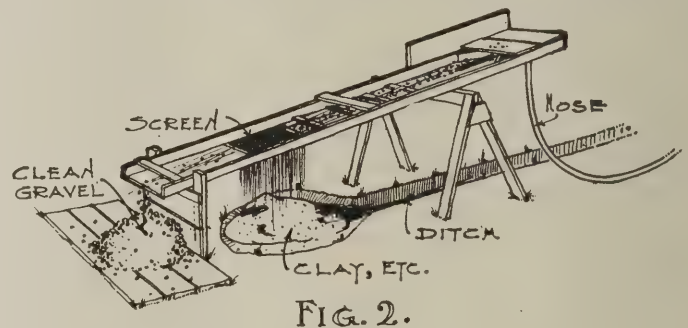
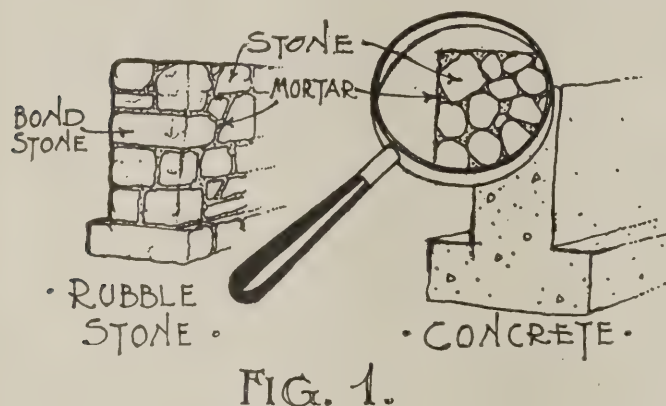
Note the small strips across the bottom of the trough. These serve as

be used for the screen—a large-meshed screen easily clogs with gravel and also will allow the smaller particles to drop through with the clay, etc. The screen should be washed frequently by playing the hose directly upon it, as a dirty screen will allow considerable clay to pass over it. The inclination of the trough should be at least 15 degrees with the ground. A ditch should be dug to keep the dirty water from accumulating under the trough.

Gravel Layers

The photograph illustrates a typical condition which is largely responsible for leaks in concrete. In this particular case the pocket under the window sill was due to a failure to thoroughly tamp the concrete around the window.

This shows that when window frames etc., are set in place before concrete is poured, special attention to tamping is



cement is required. This is a reason for the importance given in specifications to the cleanness of the materials used in concrete.

In some localities gravel is found which contains so much clay, etc., that it is practically worthless for use in making concrete. Sometimes an attempt is made to overcome this fault by using more cement than is customary, but this is expensive as well as unsatisfactory.

Washing the gravel thoroughly with water is the only sure way to make good concrete out of dirty gravel and the saving in cement on even a small foundation will save several times the cost of washing.

Cleaning Gravel

The accompanying sketch, Fig. 2, illustrates a simple and inexpensive apparatus for cleaning gravel. It consists of an inclined trough with a screen near the lower end. The gravel is thrown into the trough at the upper end and a hose stream washes it down the trough. Most of the clay and water will flow

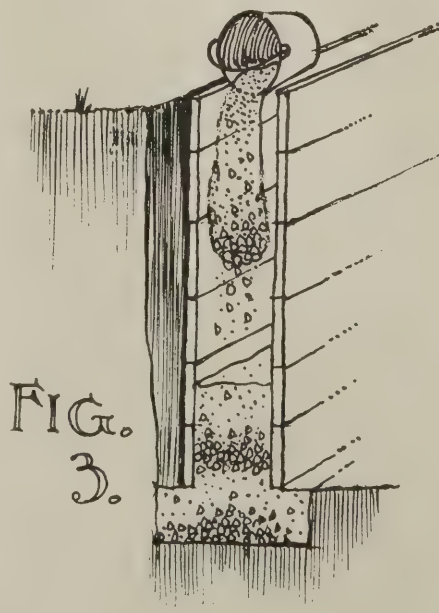
baffles, and help to agitate the gravel as it rolls down the incline. Heavy—not coarse meshed—screen wire should

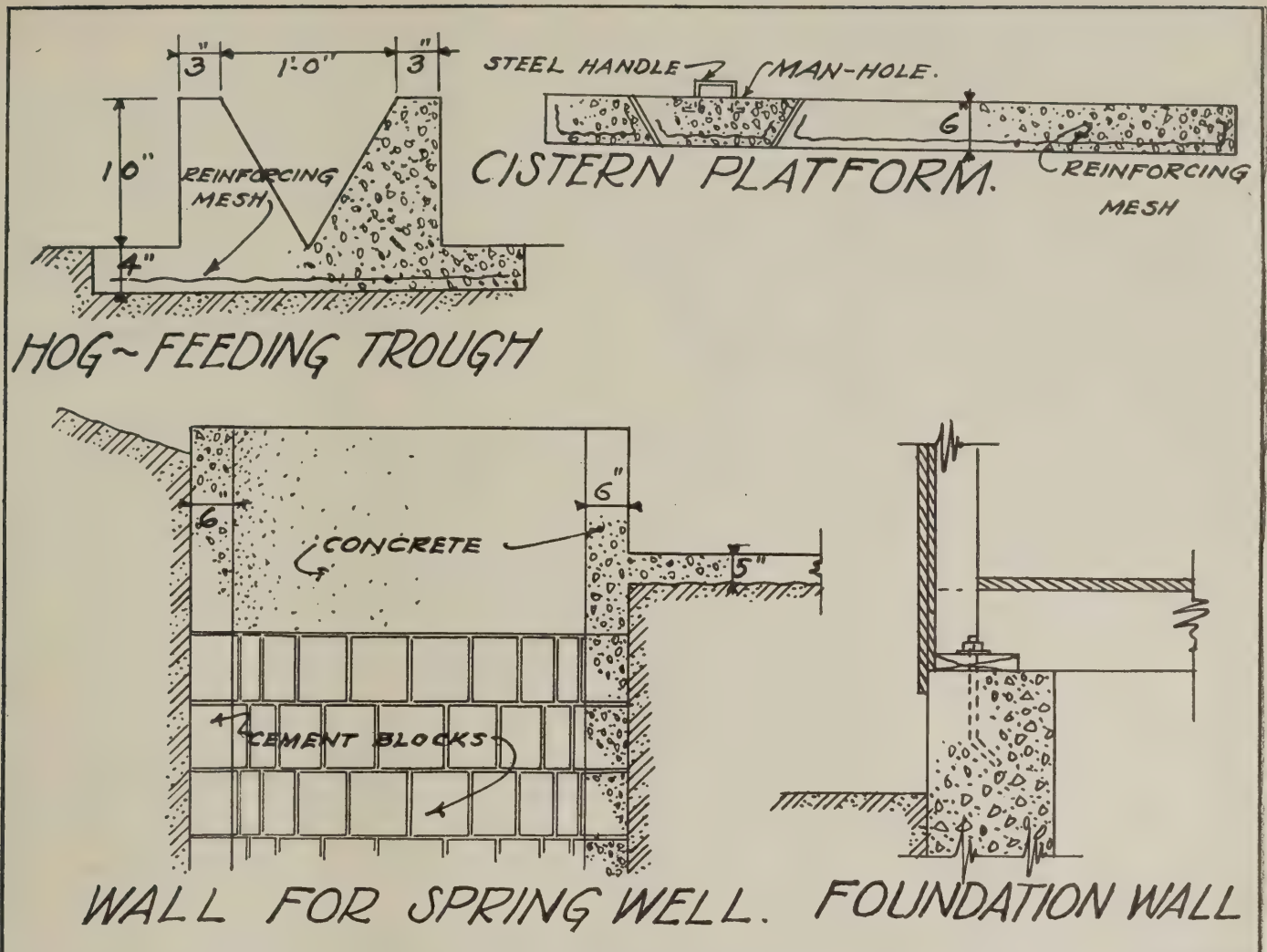
required. The gravel streaks which extend beyond the window on each side, are due to too much water in the concrete. When concrete is too wet, the materials tend to separate, the small ones sinking to the bottom leaving the large ones on top.

Fig. 3 indicates another cause of gravel streaks. When concrete is deposited in a form from a height greater than four feet the materials also tend to separate into layers as shown by the sketch. When it must be handled from a height greater than four feet use a chute.

The only remedy for gravel streaks is to remove them with a cold chisel and fill the hole with cement mortar. Be sure that the sides of the hole are washed free from dust, etc., before mortar is applied. This remedy is a makeshift and an expensive one. Care in proportioning, handling and tamping are sure preventives of gravel streaks in concrete and proper attention to them in the first place will save much trouble afterward.

With respect to concrete on the farm,





Architect C. P. Rawson submits the following:

First there is shown a section through a spring well, made from concrete blocks with a concrete curb and platform. The curb should be high enough to keep out surface water. A flowing spring is worth a great deal and should be properly taken care of.

Underground cisterns are better made of concrete than brick as they have no joists. A reinforced cover with a square manhole like the detail given should be made for them.

Hog-feeding troughs made as a part of the feeding floor are shown. Such troughs do not rot, rust out or leak.

Proper construction of a barn entrance floor is shown. The method of securing frame buildings to concrete foundations, and concrete gutters around buildings, are detailed next. These gutters keep the basement dry and serve as a walk around buildings.

A concrete watering trough should be on every farm. They are easily made. Reinforcing mesh should always be used.

Dairymen long ago decided that concrete made the best cow-barn floor. The details show the proper construction of such floors and suggested arrangement.

KIND OF CONCRETE MIXTURE	PROPORTIONS BY PARTS			TWO-BAG BATCH						
	CEMENT	SAND	STONE OR GRAVEL	MATERIALS			CONCRETE	MEASURING BOXES INSIDE DIM.		WATER IN GALLONS.
				CEMENT BAGS	SAND CU. FT.	STONE OR GRAVEL CU. FT.		SAND	STONE OR GRAVEL	
1-2-4 CONCRETE	1	2	4	2	4	8	9	2'x2' x 12"	2'x4' x 12"	10
1-2½-5 CONCRETE	1	2½	5	2	5	10	10.8	2'x2½' x 12"	2'x5' x 12"	12½

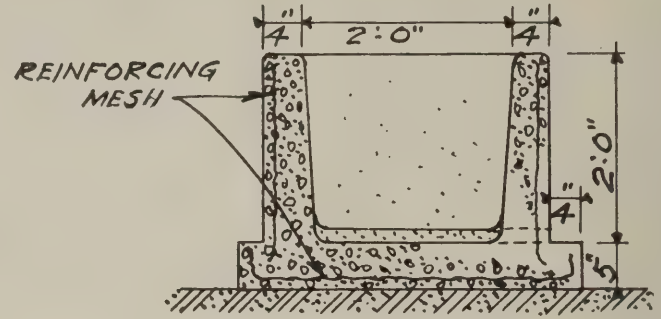
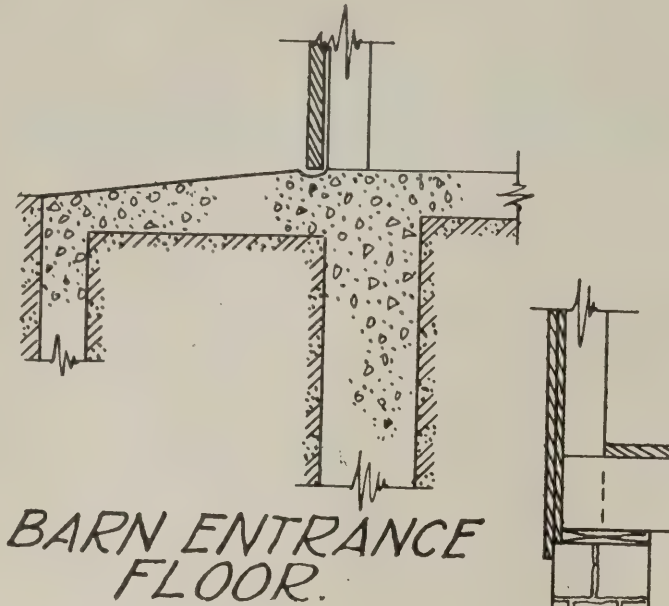
CONCRETE MIXING TABLE.

The laying of walks and driveways demands concrete. The drawings show the methods employed. Alternate blocks are laid between cross boards and when these are dry the boards are removed and the remaining blocks filled in.

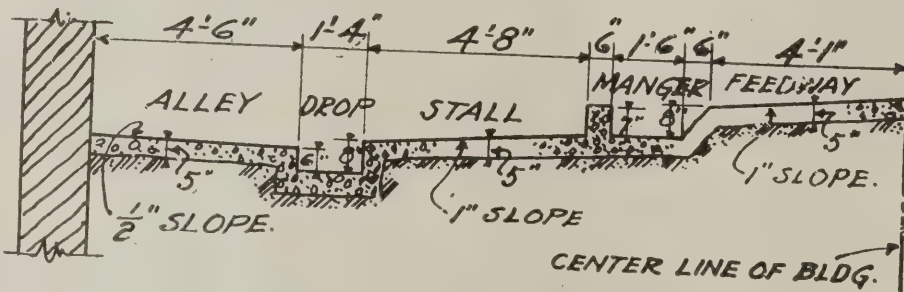
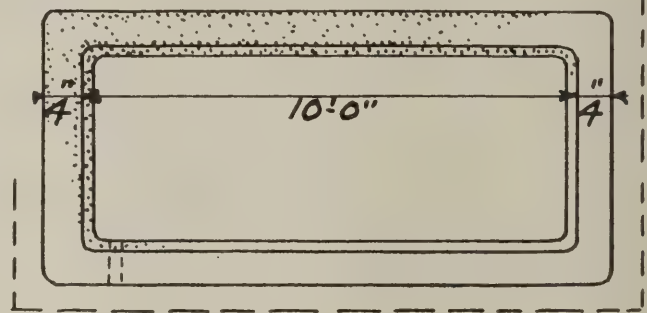
A permanent survey monument or

land-boundary marker is detailed. To property-owners these are of the utmost importance. Expensive legal fights and resurveys may often be avoided by their use.

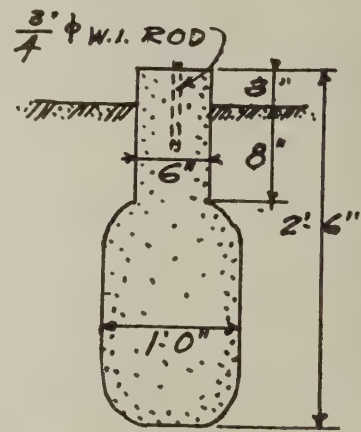
A table showing the quantities of materials to be used is shown above.



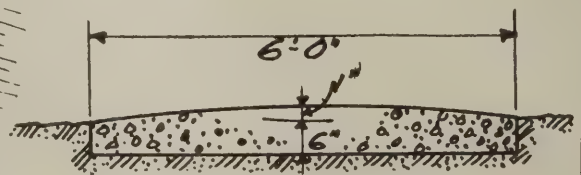
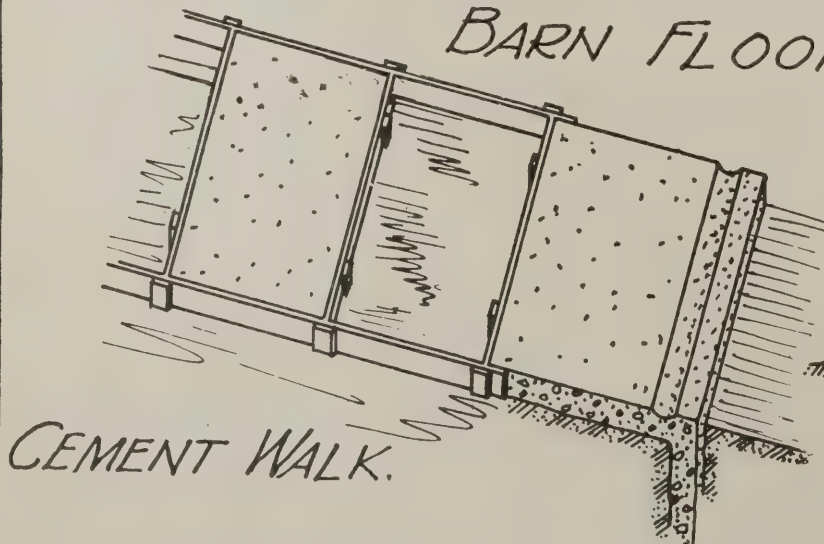
SECTION
WATERING TROUGH
PLAN



HALF SECTION THRU-COW
BARN FLOOR.



SURVEY MONUMENT.



CONCRETE DRIVEWAY.

Notes on Wall Furring

ON cheap work, interior plaster is often applied directly to the face of masonry walls and insofar as its sticking qualities are concerned this is as good a method as any, as brick and concrete have considerable affinity for plaster. So long as moisture does not penetrate the wall this method proves successful.

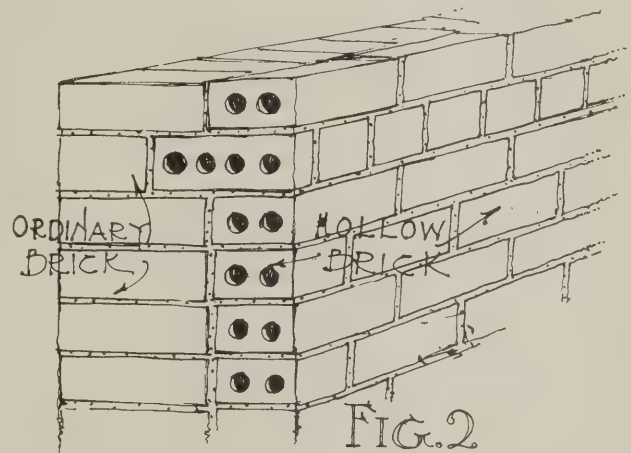
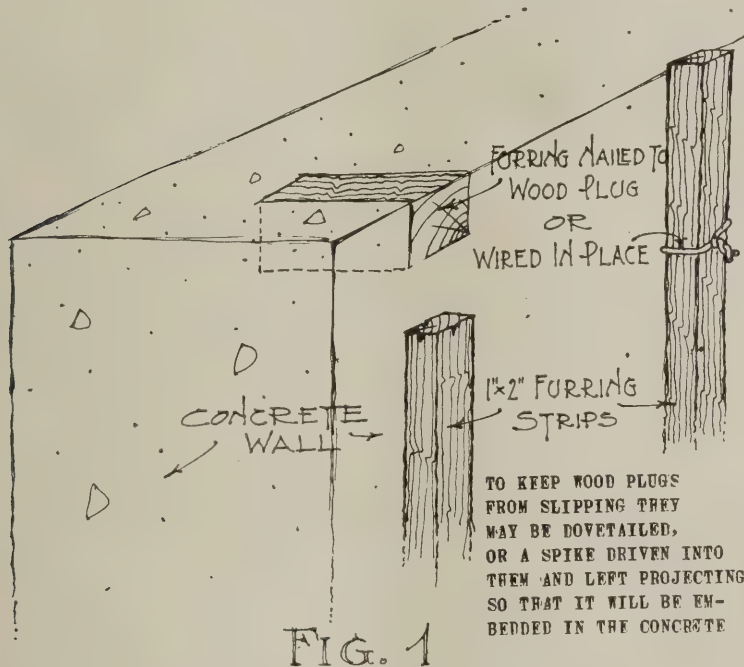
Very few masonry walls, however, are moisture proof and even in dry climates the wall is likely to "sweat." If discolored, cracked and broken plaster is to be avoided, it is necessary to use some sort of furring to separate the plaster from the wall. There are four general

Furring Bricks

Furring bricks, see Fig. 2, are made of brick clay. They are made the same size as ordinary bricks and are built into the walls in the same manner. They are made hollow in several different types, all of which are designed to reduce the solid connection between the wall and the plaster. They are not used for first class work as they do not have the efficiency that goes with an entire separation between wall and plaster but they are better than nothing. They may be obtained in almost any locality at a cost very little greater than for ordinary brick. Solid porous bricks are inserted

would form a solid connection between wall and plaster. Gypsum furring blocks have the same general characteristics as the terra cotta ones and are applied in the same manner, but the units are larger, their face dimensions being 12 inches high by 30 inches long. They are lighter than tile and are said to resist fire better. They are probably as cheap as tile when their lighter weight and lower cost of erection and plastering is considered. They require about one-third less plaster than tile does.

Either of the above materials should be purchased from responsible manufacturers, as underburned tile, or that which



types of furring used for this purpose. Wood strips, clay brick, tile or gypsum blocks and metal furring.

Wood Furring

Wood furring, see Fig. 1, is used for ordinary construction as it is cheap and easy to obtain. It is usually made of 1x2 inch strips placed vertically, and is nailed into the joints of masonry or into wood plugs placed in the concrete when the wall is constructed. Sometimes wires are substituted for the plugs and the furring is wired in place, or corrugated metal wall plugs for nails are placed in masonry joints or in concrete. The furring is placed on 12 or 16-inch centers and lath is put on them just as for studding. Wood furring is not recommended as it forms a dangerous channel for the spread of fire.

where required to give a nailing for wood trim, etc. Joists, beams, etc., should not rest on hollow brick, but should extend onto the wall for a bearing.

Terra Cotta Furring Blocks

Terra cotta furring blocks, see Fig. 3, are usually 2 inches thick and 12 inches square; they are made of dense porous, or semi-porous tile. If porous tile is used no nailing strips for trim are required. Dense tile are considered to offer more resistance to the passage of moisture and solid porous tile can be used with them to get nail bearings for trim. They are secured to the wall by driving 10d nails into the joints of masonry or into wood plugs, and bending the head of the nail down over the top edge of the tile. Use one nail over every third block in every second course. Do not bed the tile in mortar at the back as this

contains free coloring matter will sometimes discolor the plaster.

Gypsum tile should be free from sand, lime, cinders and other cheap fillers.

Metal Furring

Metal furring, see Fig. 5, is used in combination with metal lath, in fact the two often come already put together in the form of sheets that range in size from 14 to 26 inches wide and 5 to 10 feet in length according to size desired and to the manufacturers' standards. The 21x96-inch size is most common. The furring strips are punched to receive the nails that are used for attachment to the wall. This makes an excellent type of furring as the separation between wall and plaster is almost complete. The principal objection to metal lath is, that it requires so much plaster, but as this excess of plaster serves to

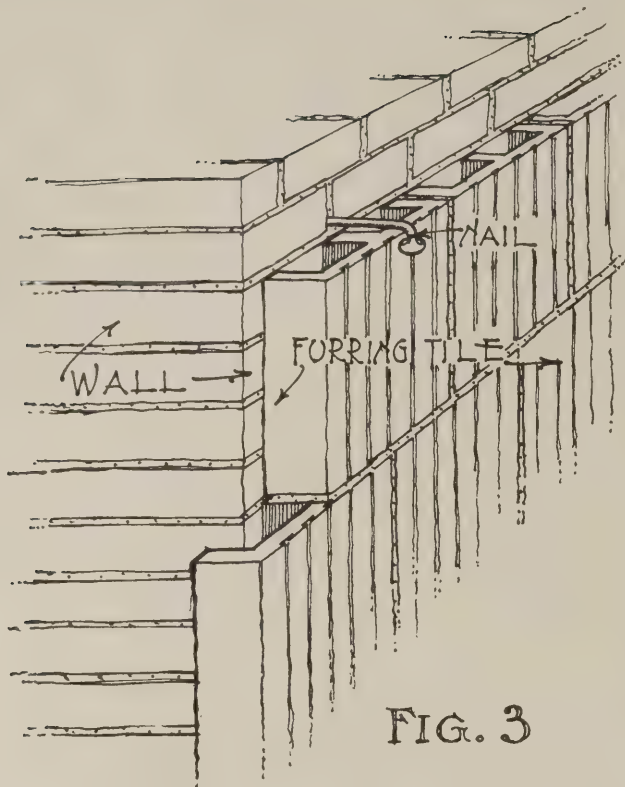


FIG. 3

TERRA COTTA FURRING BLOCKS ARE GROOVED TO FORM A KEY FOR PLASTER. GYPSUM TILES ARE GROOVED LIGHTLY, IF AT ALL, AS THE PLASTER ADHERES WITHOUT THE AID OF A MECHANICAL BOND.

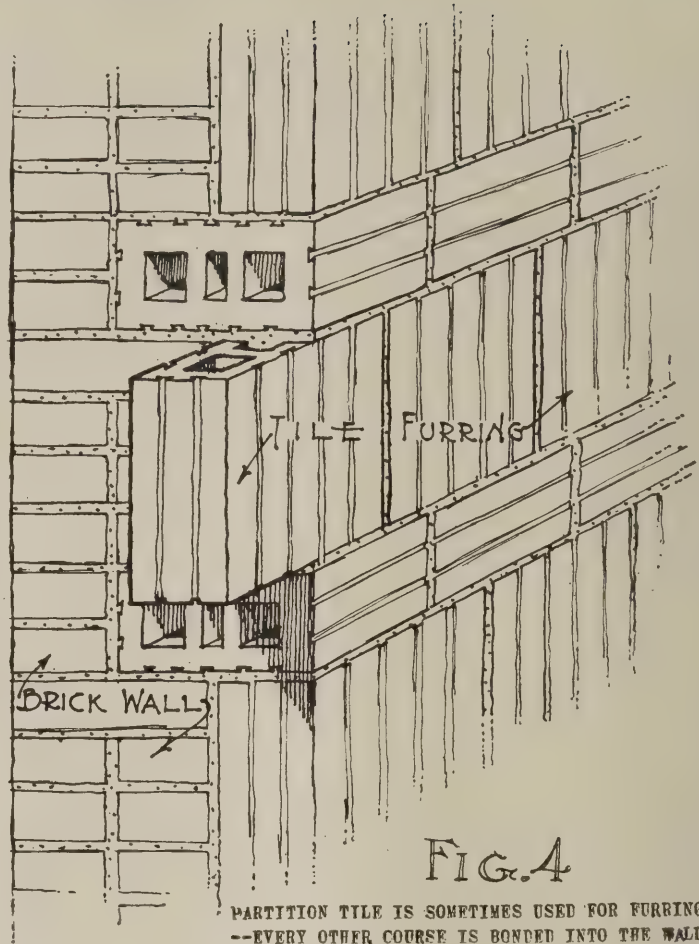


FIG. 4

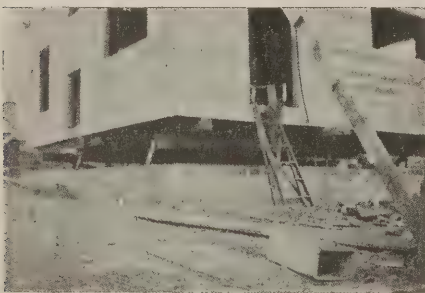
PARTITION TILE IS SOMETIMES USED FOR FURRING. --EVERY OTHER COURSE IS BONDED INTO THE WALL.

protect the lath as well as form a key its cost is not considered in good work.

Another advantage of furring, besides its obstruction to moisture, is its effectiveness as an insulator against heat and cold. The air spaces between the wall and plaster have considerable value in protecting the wall from extreme heat in case of a fire.

ONE WAY TO SAVE TIME

If you had a contract for a house but found that your foundation material was



A Time-Saving Job

delayed, would you hold up the job by waiting for the material? This progressive builder of Janesville, Wisconsin, didn't. He put his wits to work and found a way to keep the job going, in-

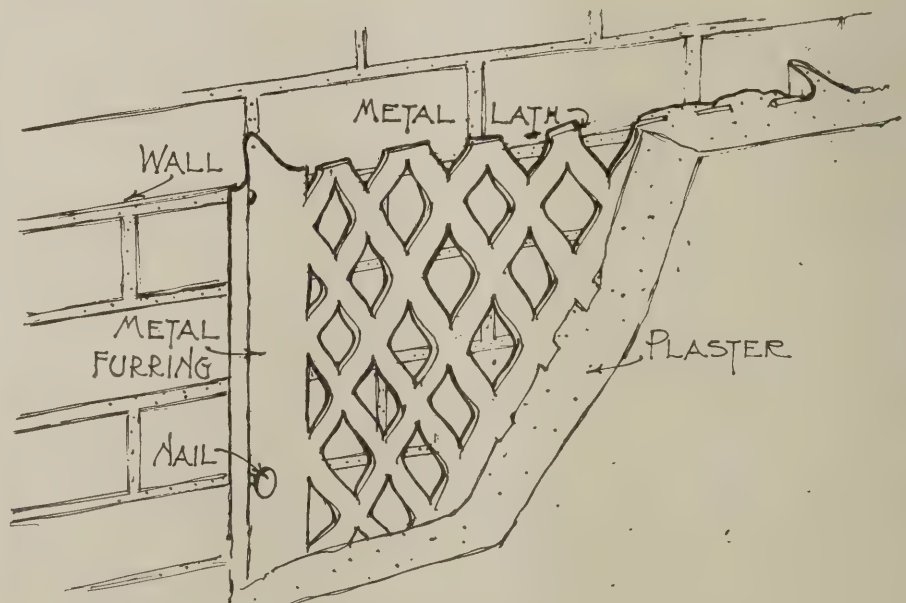


FIG. 5

METAL FURRING IS OFTEN SEPARATE FROM THE LATH, AND THE LATH IS WIRED TO IT OR ATTACHED BY PRONGS ON THE FURRING, ETC. SOME BRANDS HAVE THE FURRING NOVEN INTO THE LATH

stead of lying down at such a crisis and waiting for the materials. He dug the excavation, put in a heavy timber frame-

work, and went ahead with the building. The house is now about to be placed on its proper foundation.

End Stiffener for Barns

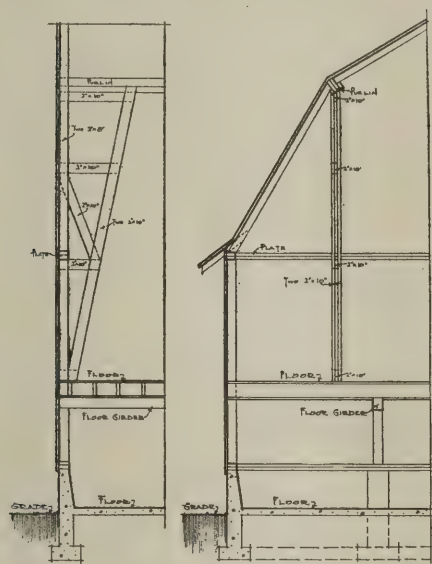
Heavy Timbers and Other Heavy Construction is Neither Desirable Nor Economical in Barns or Any Other Buildings When Used to Supplant Good Workmanship and Intelligent Engineering

THE accompanying drawings illustrate methods of stiffening the ends of balloon framed barns; but no attempt has been made to show any framing except

The plate and the posts which form part of the stiffeners must be well spiked together, as the plate is largely instrumental in carrying the wall loads to the

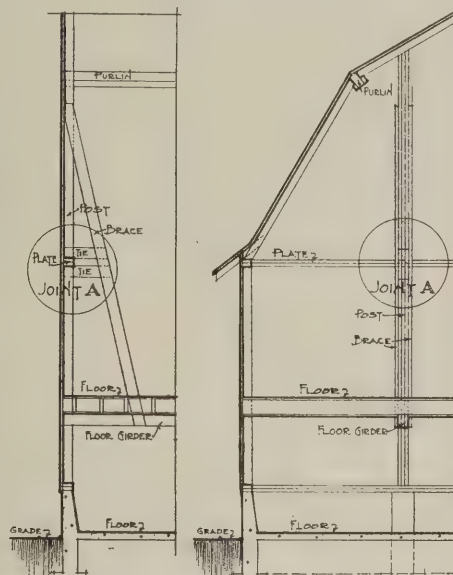
known as an end-truss. It acts as a stiffener for the post which carries the end of the purlin and also prevents any bulging of the post. An objectionable feature is that a portion of the thrust is transmitted to the top of the post where the resistance is low.

Another type of stiffener is known as an end-brace. By using this brace any push or thrust against the end wall is



In this type of stiffener or end-truss is the defect that it carries a portion of the thrust to the top of the post, where resistance is low.

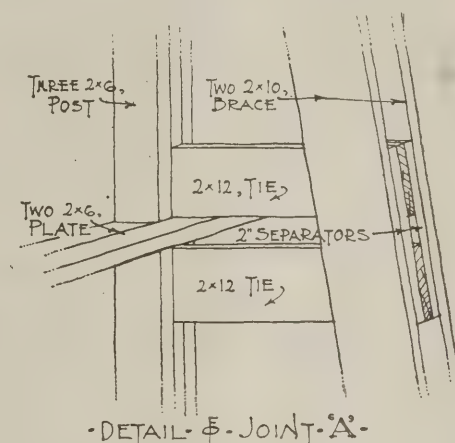
that for the stiffeners, and the principal members of the usual barn framing. Studding, etc., has been omitted for the sake of cleaners. There should be two stiffeners at each end of the building.



This style of stiffener or end-brace carries the thrust against the end-wall to the floor girder and makes it harmless.

brace. Use plenty of spikes in all built-up members and joints. The efficiency of wood joints which are subjected to considerable stress is very low.

The type of stiffener commonly used is



carried to the floor girder and rendered practically harmless. It takes up a little more floor space than the end-truss type does, but it is more efficient.

Sometimes these stiffeners are replaced by 2x8 pieces which are placed diagonally across each corner of the barn and the ends are spiked to the plates.

The Farm House Competition Announced in the January Issue Will Close May 15, 1919

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of National Builder published monthly at 542 S. Dearborn St., Chicago, Illinois, for April 1, 1919.

State of Illinois, County of Cook.

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared W. D. Callender, who, having been duly sworn according to law, deposes and says that he is the business manager of the National Builder and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the pub-

lisher, editor, managing editor, and business managers are: Publisher, Trade Press Publishing Corp.; Editor, A. H. McQuilkin; Managing Editor, A. H. McQuilkin; Business Managers, W. D. Callender and Geo. P. Miller, all at 542 S. Dearborn St., Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Trade Press Publishing Corp., individual stockholders: W. D. Callender, T. J. Sullivan, Geo. P. Miller, A. Perrin, N. C. Rockwood and Fred D. Porter, all at postoffice address, 542 S. Dearborn St., Chicago, Ill.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) There are none.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and

security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) W. D. CALLENDER.

Sworn to and subscribed before me this 24th day of March, 1919.

MICHAEL J. O'MALLEY, Notary Public.
(My commission expires March 8, 1920.)



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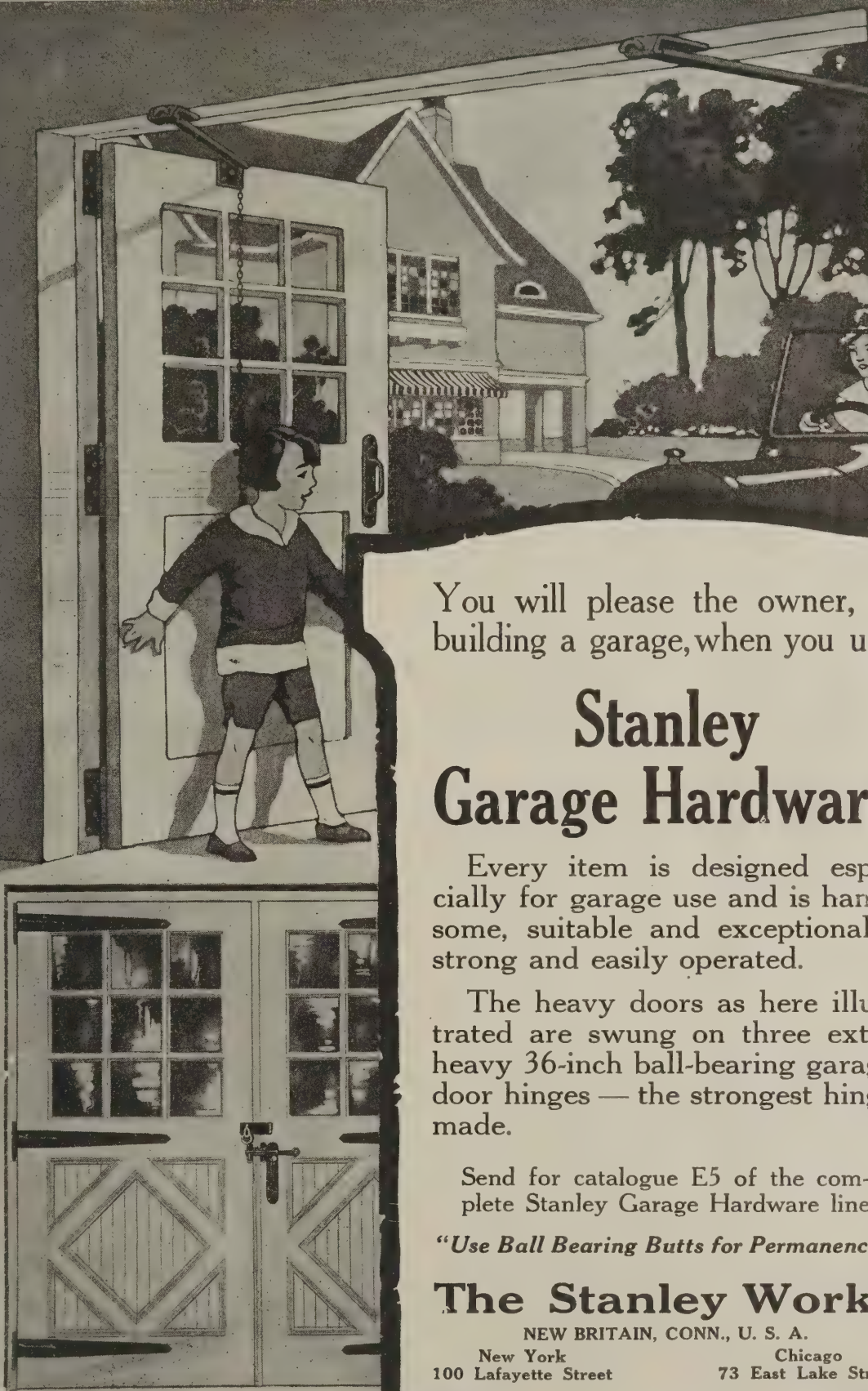
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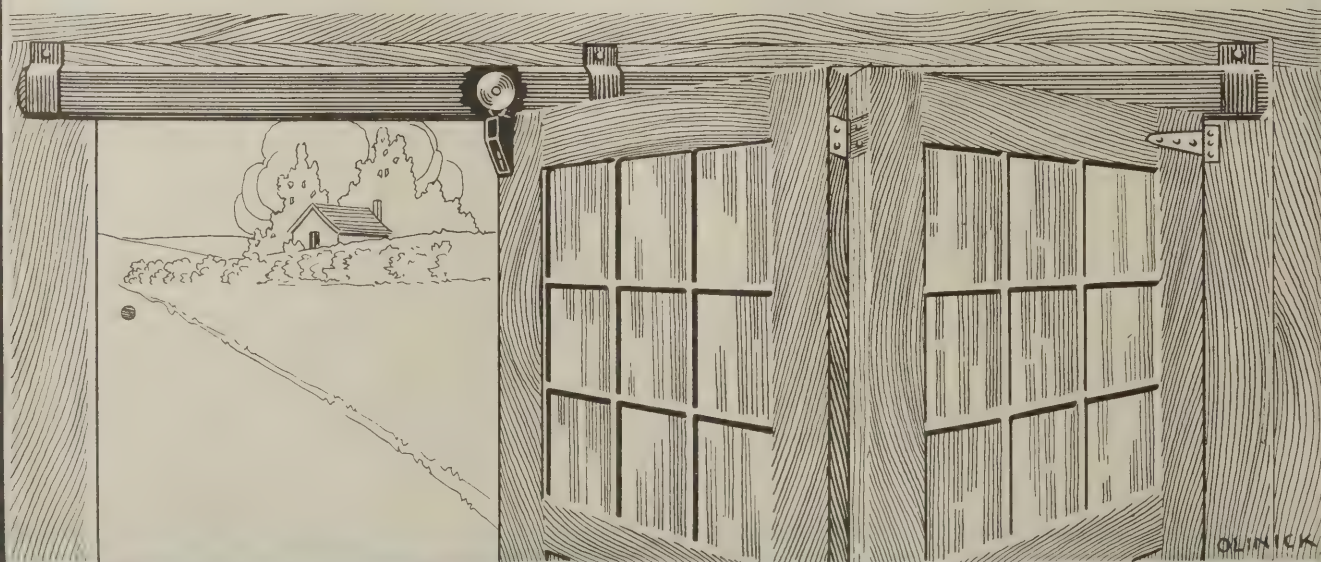
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STORE FRONTS
A COMBINATION OF
STRENGTH AND SIMPLICITY
SOLD AT A MODERATE PRICE

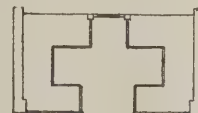
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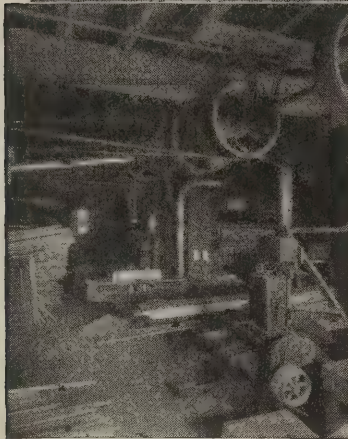
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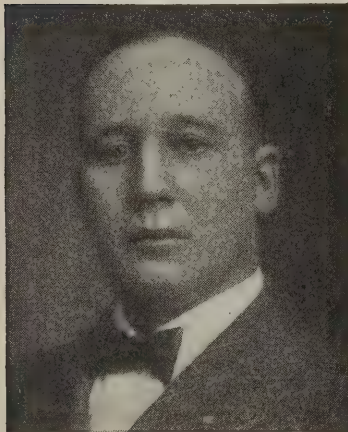
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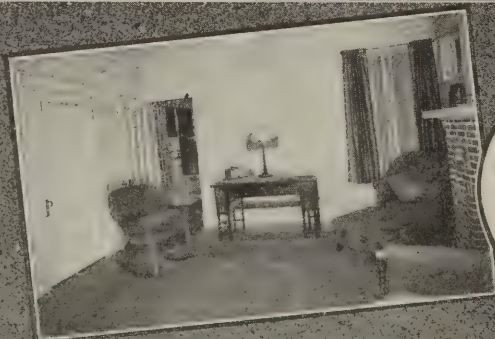
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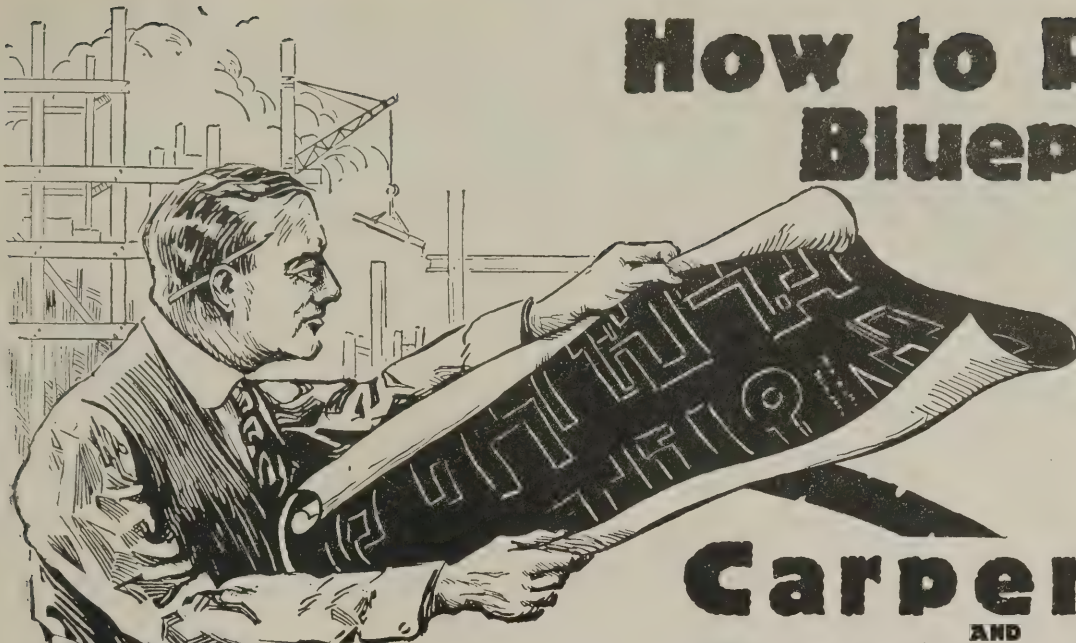
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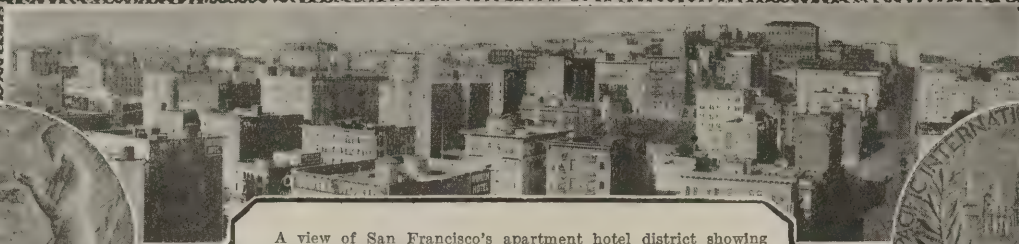
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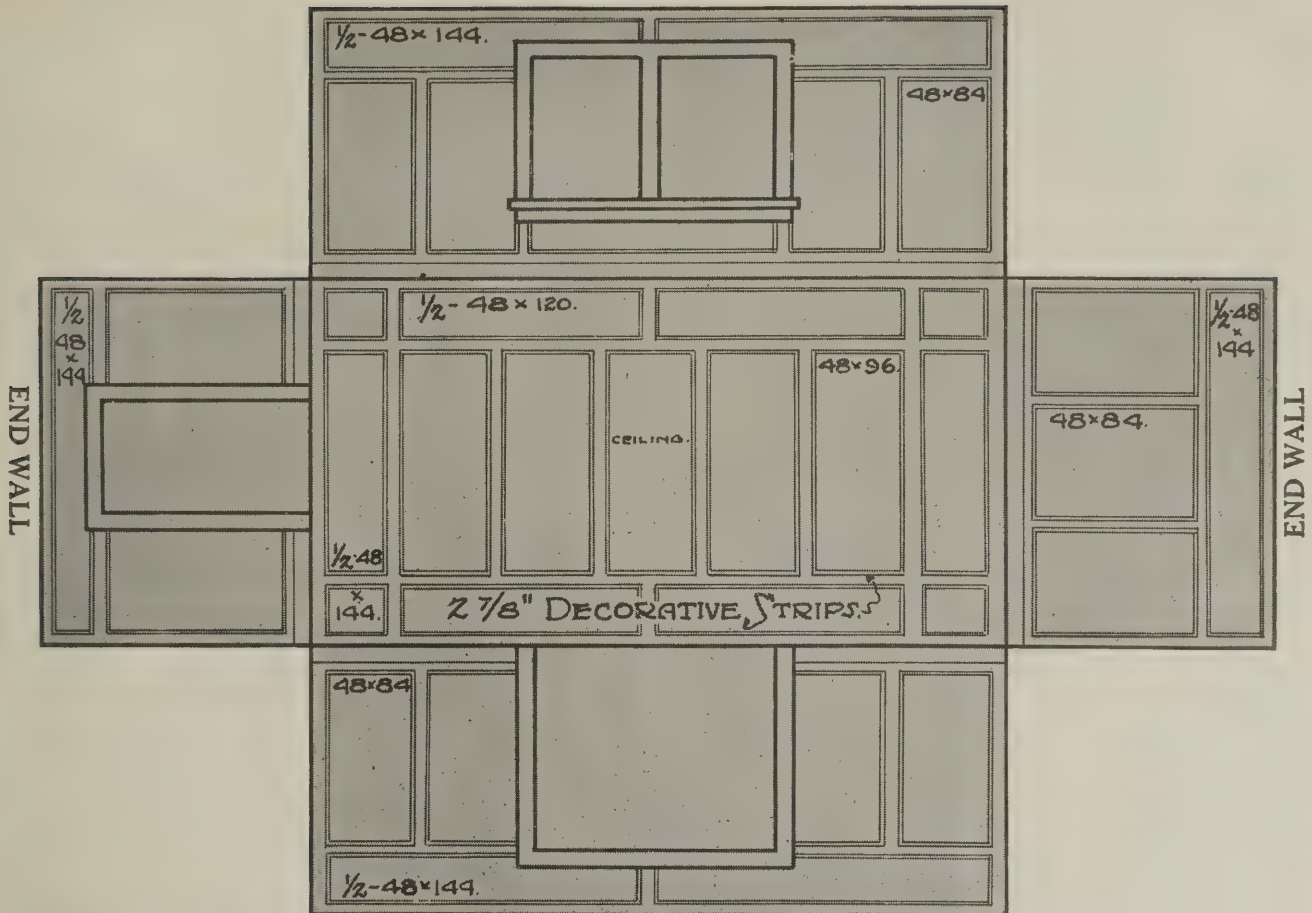
On the left, interior of living room — no suggestion of bed. On the right, same room — a bed room now! Modern efficiency!



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Use our free Plan Service and you will not only get the advantage of years of study by experts, but it will help you get that variety in your work which means repeat business.

Our designers submit blueprints of complete jobs, whether for whole houses, theatres, stores, or for the building of a single room in the attic.

Send us a rough sketch show-

ing dimensions of walls and ceilings, locations of doors, windows and their sizes, etc., and we'll suggest color schemes and decorative effects to harmonize to best advantage. Special charts sent on request to assist you.

Black Rock Wallboard is the only wallboard with the moisture-repellant black center, and is surface-sealed and sized as well.

Let us give you the name of the Black Rock dealer in your vicinity. He is a good man to know.

THE BLACK ROCK WALLBOARD COMPANY

55 Ontario Street

Buffalo, New York

Dealers—Write for details of our exclusive sales plan.



BLACK ROCK WALLBOARD

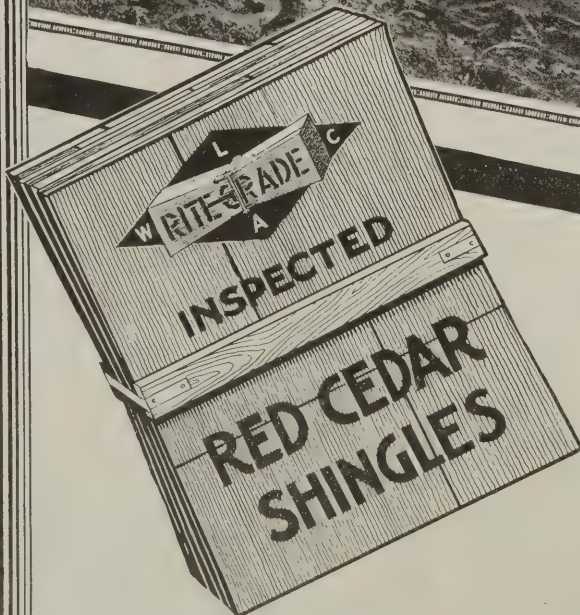
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A beautiful booklet containing a wealth of building information and many valuable suggestions for the builder.



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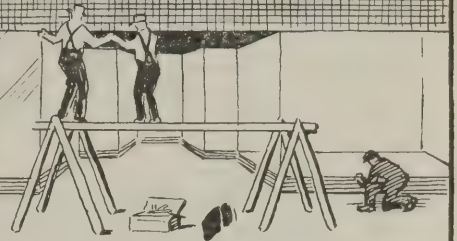
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- ☐ Prospective Builder
- ☐ Contractor
- ☐ Carpenter
- ☐ Lumber Dealer

Shingle Branch, West Coast Lumbermen's Ass'n, 428 Henry Bldg., Seattle, Wash., or
The Shingle Agency of British Columbia, 1026 Standard Bank Bldg., Vancouver, B. C.

Easy
to
Install

COULSON IS BEST



A Profitable Job Well Done

There are two kinds of store fronts. One—the sort that takes a dozen men and forever and anon to erect.

The other sort is put up with few hands in an incredibly short time. You finish the job knowing it's O. K., and that you've made a nice bit of money on it. That's the Coulson.

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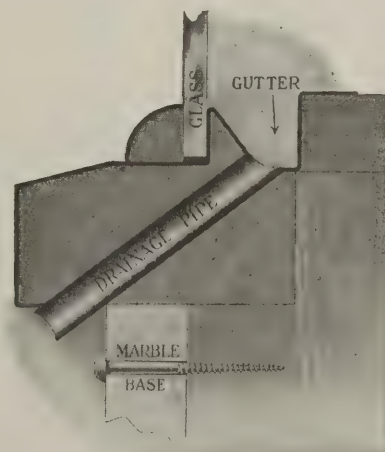
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STORE FRONTS

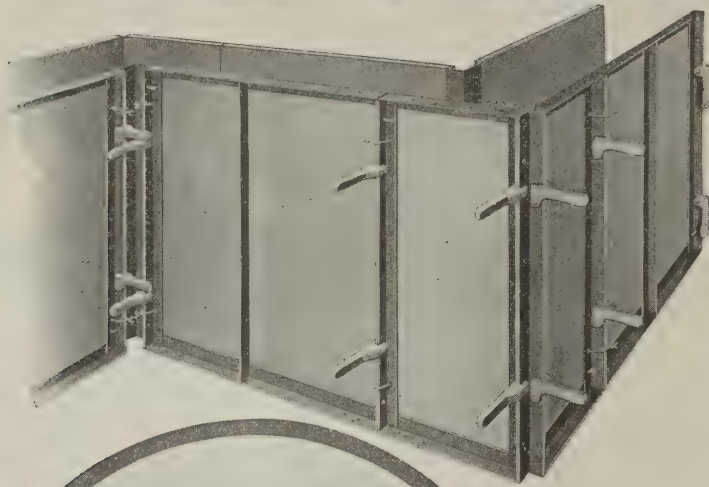
are recommended by insurance companies because they have no direct screw pressure and hold glass safely against highest winds. So you can see why your customer will be pleased.

But you want details. They're in our big, beautiful, colored catalog. Write for it on your letterhead. Do it now!

The J.W. Coulson Co., Columbus, Ohio



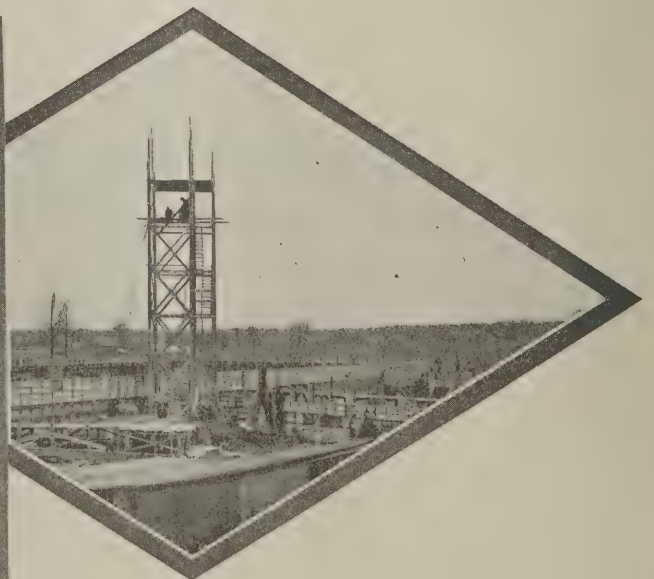
Metaform



Do you still stick to old-fashioned, wasteful, wood-form methods for erecting monolithic concrete jobs? Why employ the costly labor of skilled carpenters for something that must be torn down again almost as soon as it is put up? Why, with lumber so expensive, spoil such a terrific amount of it for only a few hours' use?

The answer is: You **wouldn't** do any of these things if you knew of a better way of doing the work.

A Metaform System of adjustable metal molds for building concrete forms will stop the waste of lumber and labor. It will enable you to pour more concrete, to pour it faster and to pour it better. And it will add to your profits on all concrete jobs, large or small.



Metal Forms

Systems *for* Faster, Cheaper Concrete Work

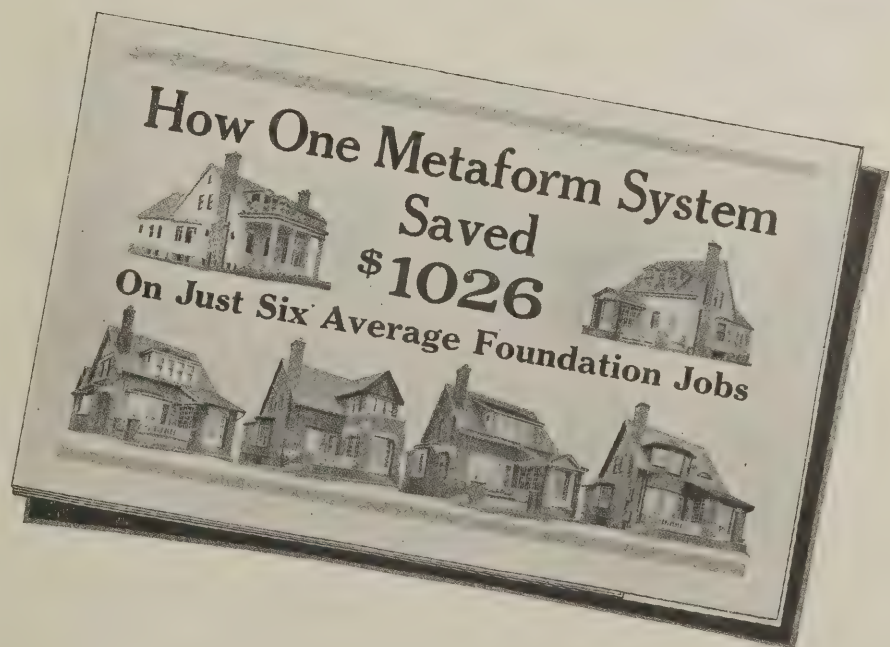


Make no mistake about Metaforms. They were devised to take care of **all** jobs—not one job. Whenever you face the problem of erecting forms for monolithic concrete, a Metaform System will enable you to do the work faster, better and cheaper. One ordinary laborer can erect more square feet of forms by the Metaform System than five or six skilled carpenters can build out of wood. Your Metaforms will be useful on job after job, while lumber for forms is a constant heavy expense.

This Eye-Opening Folder Proves What Metaforms Did on Just Six Small Jobs

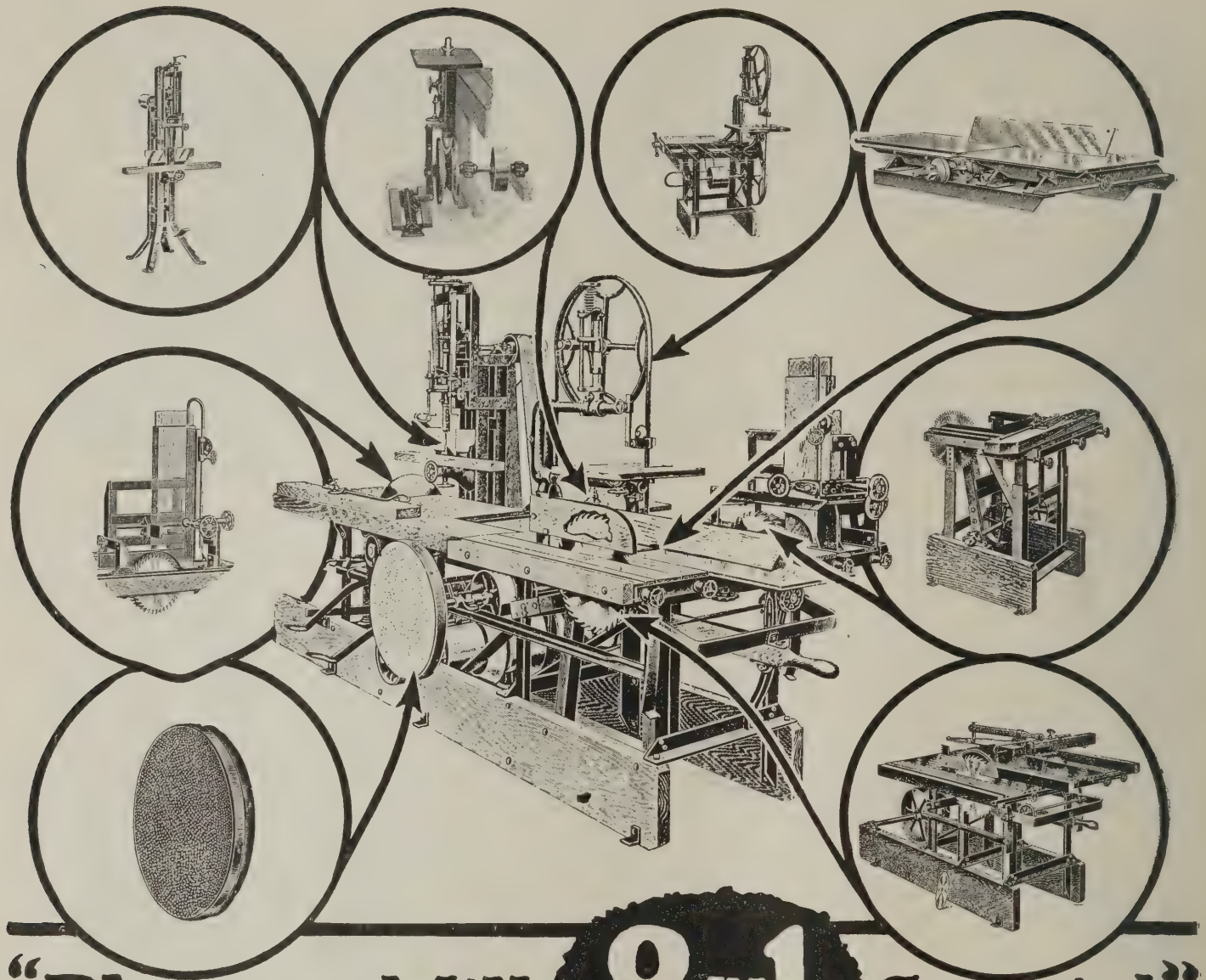
One thousand and twenty-six dollars saved by a Metaform System on six ordinary residence foundations—put right into the contractor's pocket. Is that worth while? Send for the folder that tells how it was done. Whatever you build in concrete — tanks, chimneys, silos, foundations, walls, pillars — square work or round work, straight or tapered — Metaforms will make money for you.

You'll buy Victory Bonds, of course, because they are the surest investment you can make. They herald the beginning of the big prosperity era.



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A Parks enables you to produce all dimension work, exterior mill work and interior trim.

The price is right—so moderate, con-

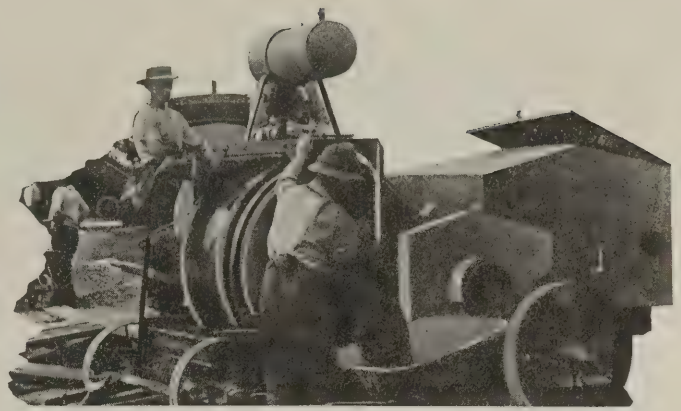
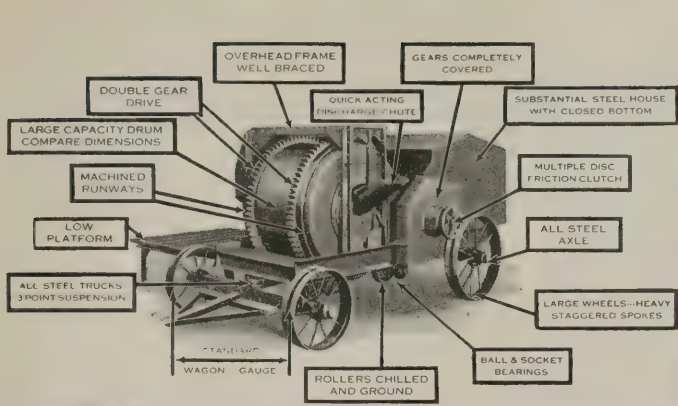
sidering its possibilities in the way of time and labor saving and for superior work—that you are actually losing money every day that you delay your purchase.

We have other models. One of them will exactly meet your requirements.

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New Catalog Just Ready for Mailing

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The Big Value Light Mixer

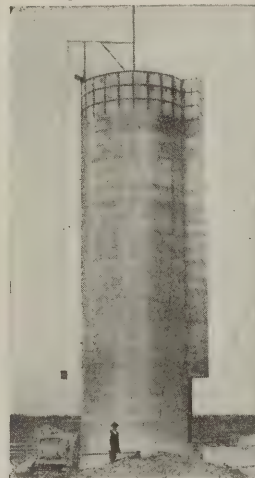
Send back the coupon at the bottom of this page—and get the full facts about the remarkable value of the light mixer field—the light mixer built first for **reliability**, and then built in **volume** to keep the price down.

No, sir, the Dandie is not the cheapest mixer—it is the first light mixer built as strong as a light mixer can be built. It stands up to all the work you can give it—is dependable to stick on the job without costly delays.

But the price is within the range of light mixer prices—that is why it is the **remarkable value**—you are surprised that you could get such construction for the price. It is only made possible by scientific design, big production and standardization

of every part. This is how we get the price down, not by skimping.

Get the Dandie Catalog—get the full details of how volume production has put new reliability into the lighter mixer field—see for yourself why the Dandie is the remarkable value of the industry.



4 cu. ft. and 7 cu. ft. capacities Wet Batch Rating. No. 104-S, gasoline, No. 107-S, steam or gasoline. May be equipped with low charging platform, power charging skip, automatic water-measuring tank and light duty hoist.

The Big Yardage Mixer for Footings, Sidewalks, Silos, Culverts, Etc.

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Please send, without obligation, your Dandie Big Value Catalog S-5, and advise me where I can see a Dandie Mixer.

Also send me information on items marked X in ☒

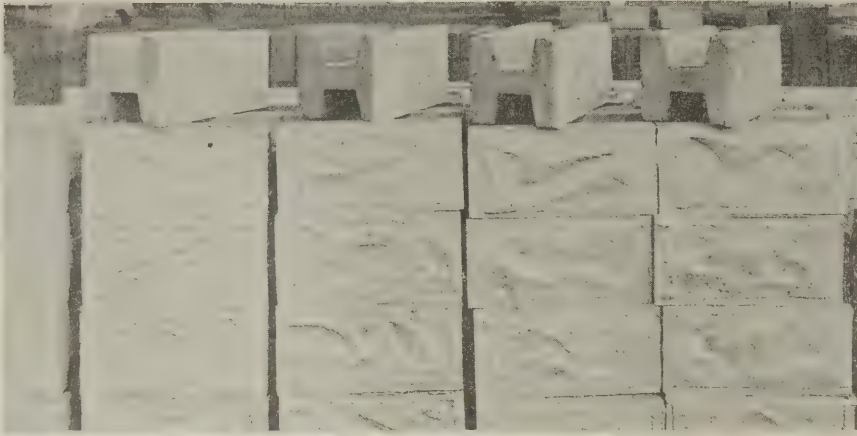
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A Little Makes a Big Difference

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For all concrete building purposes, Medusa Waterproofing in small quantities in proportion to the mix will give highly satisfactory results—at an almost negligible cost.

MEDUSA WATERPROOFING

PATENTED PASTE AND POWDER

is the original integral waterproofing for concrete. It is mixed with gray or white portland cement — put in with the sand and gravel. It seals the pores in concrete and so prevents the absorption of moisture.

Have Medusa Waterproofing ready when you **start** to build—and it will withstand any damaging action water and weather can wage against it after your building stands completed.

This Book Will Help You

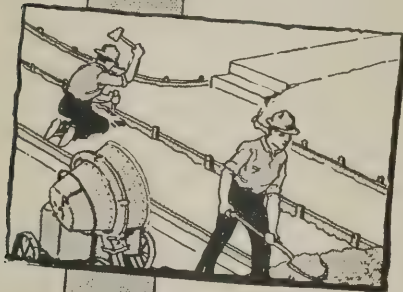
“How to Make Concrete Waterproof” we will mail you free for the asking. It explains the theory of waterproofing and contains practical facts that you can use with profit in your business. Write for it today.

The Sandusky Cement Company

Department T

Cleveland, Ohio

After-the-War Building Activities Create Hosts of Small Jobs



NOW that building restrictions have been removed, thousands of residences are being built. This means a large number of small jobs—foundations, walks, steps, gutters, driveways, retaining walls, etc.—that are profitable if you have the right equipment.

Are You Going to Pass Them Up —or Make *Real* Money Out of Them?

With a small-job mixer, specially built to handle small jobs economically—the EVEREADY MIXER—there is a mighty fine profit in this kind of work.

Here is a mixer that takes small jobs out of the “accommodation” class. It can be operated by two men handily. Easily portable—weighs only 1500 lbs.—and is mounted on substantial trucks. The

EVEREADY MIXER

has a capacity of 4 cu. ft. and turns out 35 to 50 cu. yds. per 8-hour day. A perfect mix in 40 seconds. Discharges in 15 seconds.

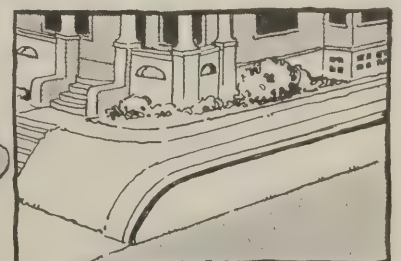
Worm drive—only one gear, one shaft, two ball bearings. Automatic discharge—no tilting of drum. One oil-hole lubricates the entire mixer.

Get the facts about this remarkable little mixer. Send for booklet “Making Small Jobs Pay.” It’s free.

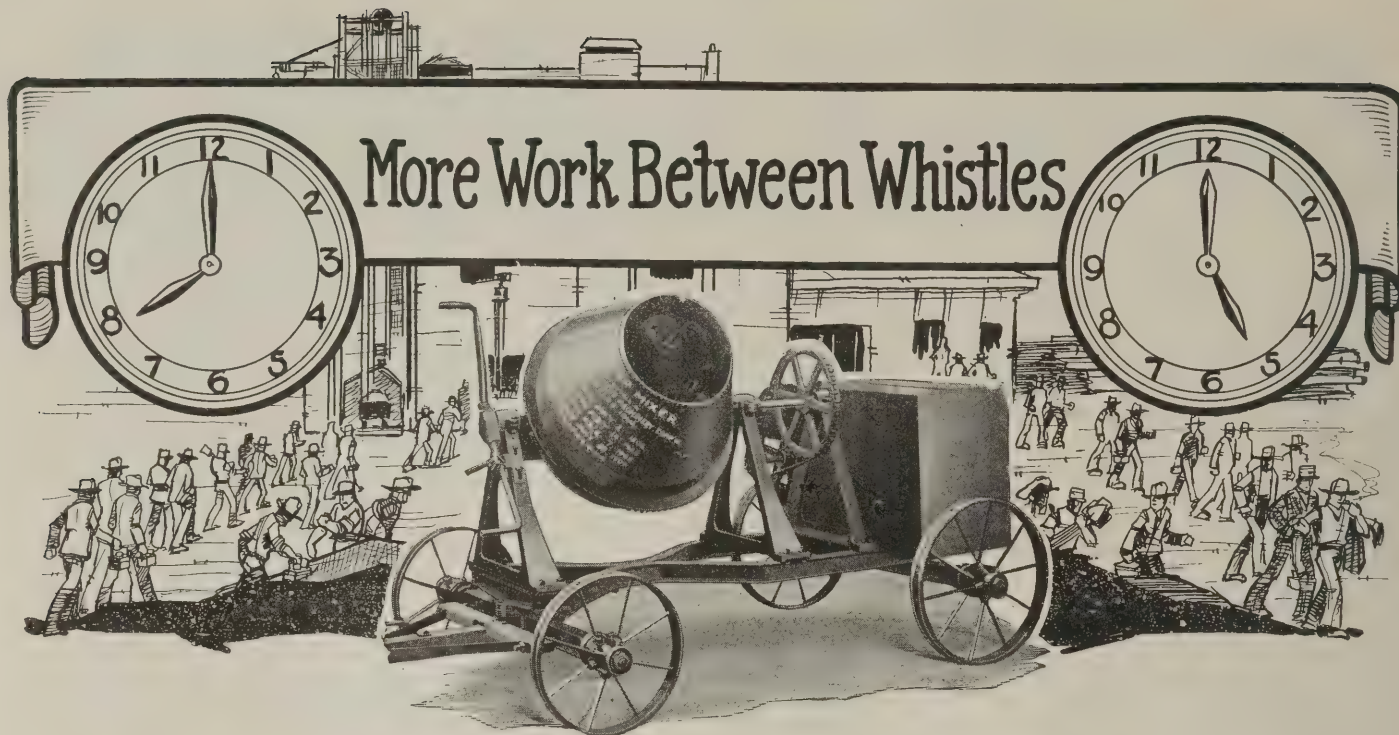
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Original Wonder Mixers

fill the wheel-barrows quicker with a more perfect mix. They enable your workmen to accomplish more.

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Wonder Models 17 and 20 are built for bigger needs. All of them, however—15, 17 and 20 have the same distinguishing qualities: Big Production—Economy—Perfect Mix.

May We Serve You?



***“The Mixer That
Makes the Money”***

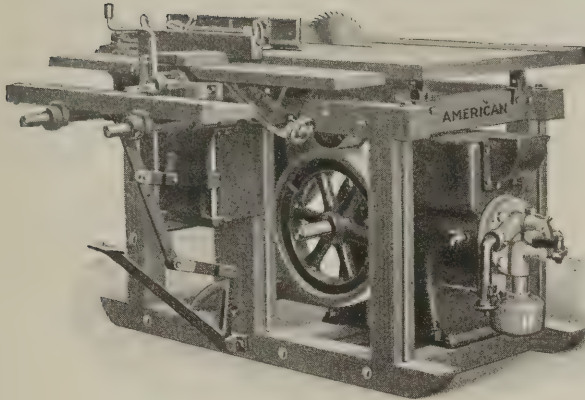
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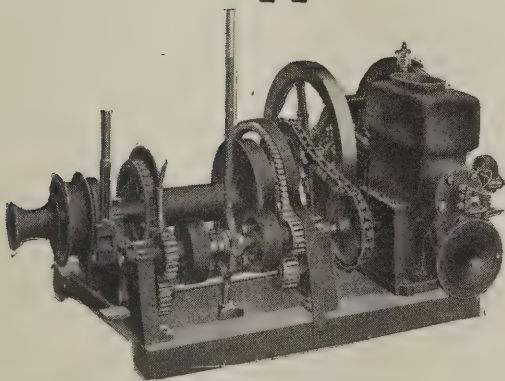
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"American" Variety Woodworker with Gasoline Engine
Built In; Also Made with Self-Contained Electric
Motor or for Belt Drive

With the labor market in its present condition, reliability counts for as much as ability, in any worker. You're more apt to find this combination in machines than in men, these days. And when it's a question of a few dollars more or less, isn't it worth a little more to buy proved reliability, proved ability for hard, high-class work? A cheap machine is as poor a "buy" nowadays as "cheap" labor.

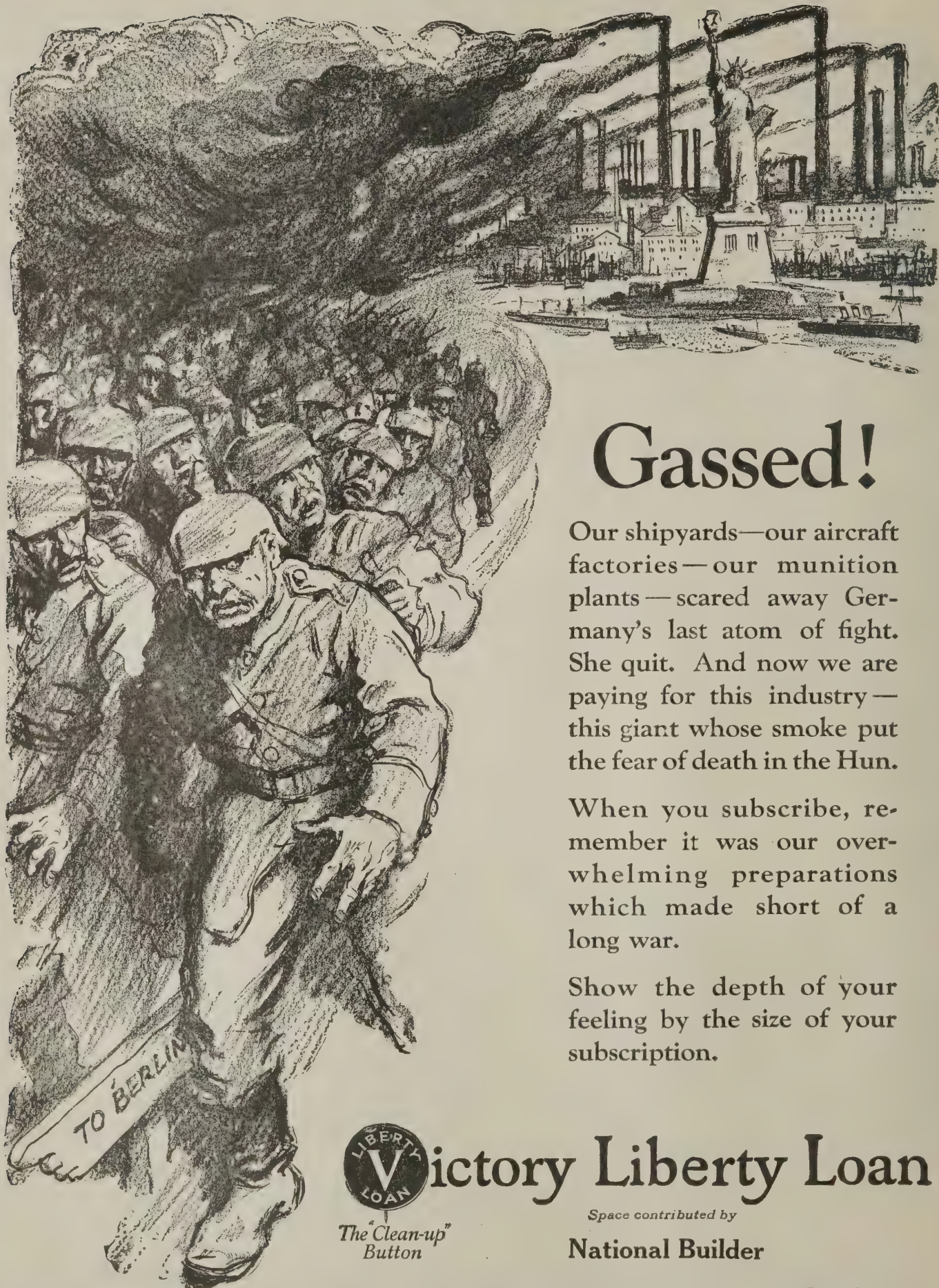
"AMERICANS"



"American" No. 4 Hoist with Self-Contained Gasoline
Engine. Also Made with Built-In Electric
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An "American" Variety Woodworker and an "American" Contractor's Hoist, make a builder largely independent of labor conditions—enable him to do his work with a small gang of selected high-class men—put him at a big advantage over "the other fellow" who must depend upon hand labor or upon less speedy, less capable machines than these "Americans." Send today for Bulletins 10 and 67. Compare these "Americans" feature by feature with any other machine. Then—follow your own judgment.

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Nos. 10 and 11

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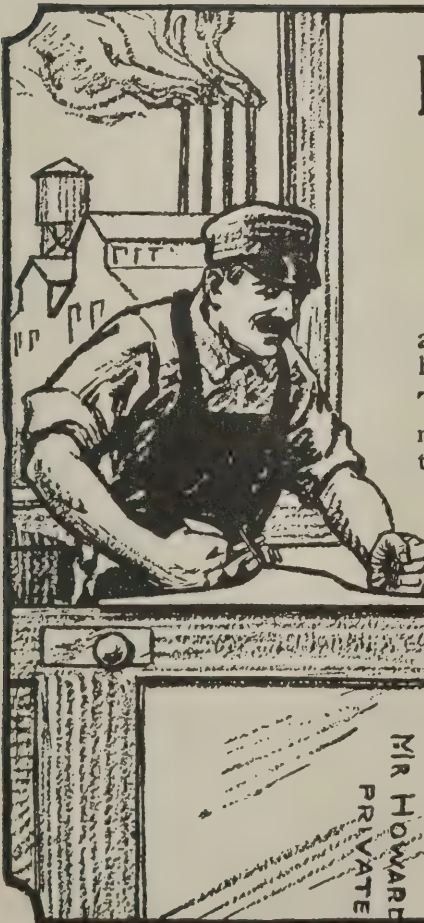


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Auto-Set Bench Planes

are particularly suited. They are light but sturdily built; the handle room is ample; the adjustments are positive and are easily made.

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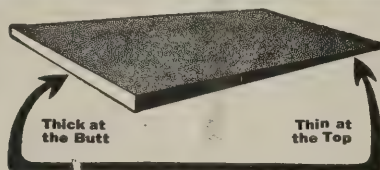


The thick butt and thin edge makes it easy to lay a good roof. Here is the modern shingle for homes and buildings. It is fire resisting, rot proof, water-tight and non-breakable. Winthrop Shingles are made of solid asphalt with fine chipped slate pressed into the exposed surface.

Winthrop Tapered Asphalt Shingles offer the convenience and lightness of wood, but look better, last longer and afford greater protection. Low in cost, high in quality.

Lay Them Like Wood Shingles With Ordinary Shingle Nails

A quick, easy job for the men. The completed roof costs no more than dipped shingles and is twice as serviceable. Winthrop Tapered Asphalt Shingles are used and recommended by hundreds of contractors. Made in three colors, red, green and slate black. Beautiful color effects are possible.

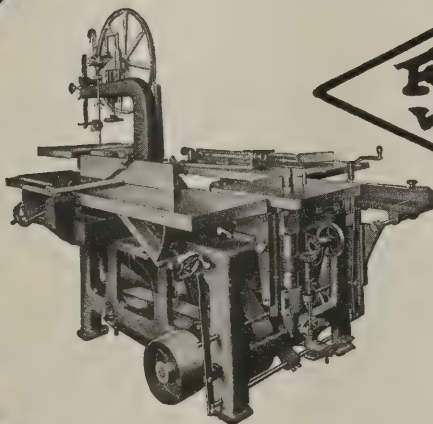


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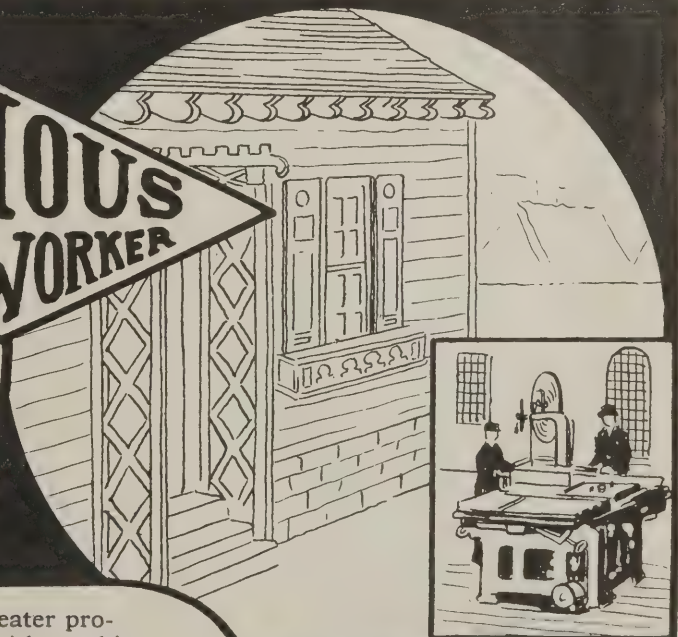
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Factory: Argo, Illinois

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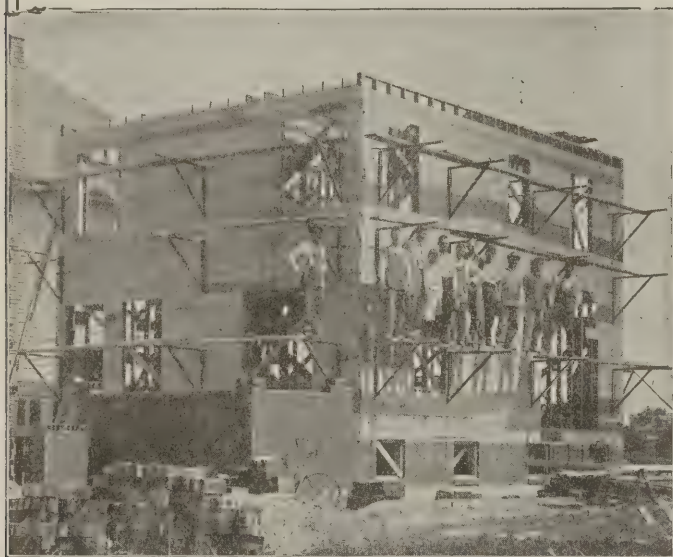
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Richards-Wilcox Steel Collapsible Builders' Brackets



Made entirely of steel in two styles and sizes. Builders who use Richards-Wilcox Steel Brackets actually save cost of investment on a single job requiring two dozen or more brackets. The strongest bracket made and the most easily applied. Costs no more than a wooden bracket and will last a lifetime.

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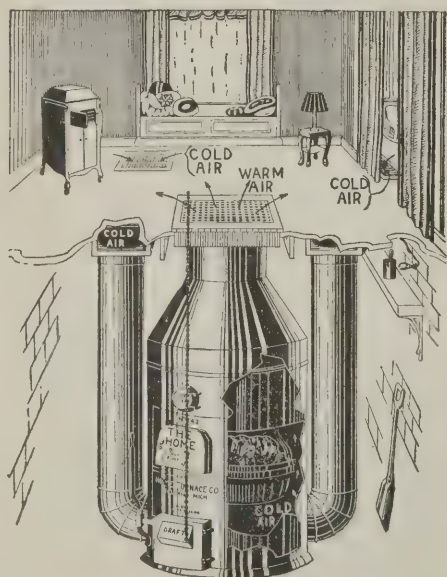
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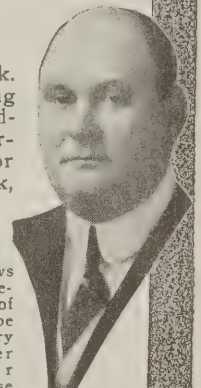
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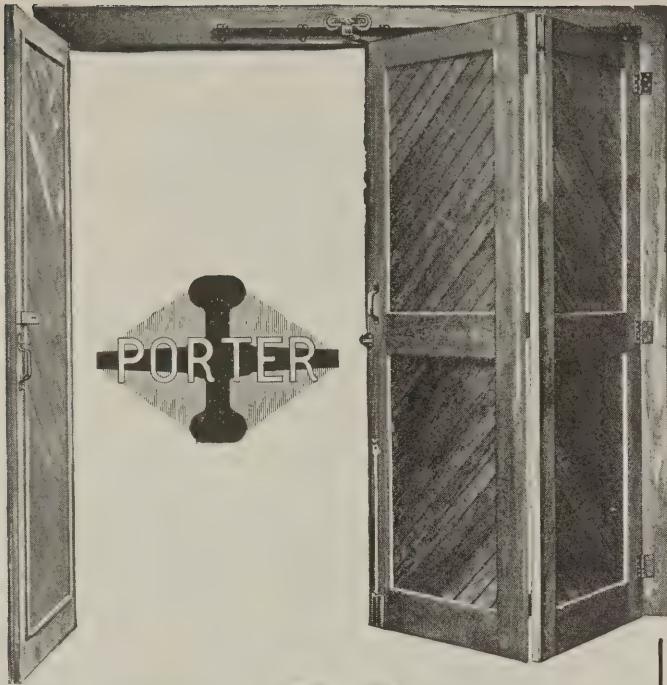
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HERE'S a new device—a J. E. Porter product—handily installed, complete in itself without extra fixtures, absolutely satisfactory in its working, with a half-dozen exclusive advantages, each one solving a problem for every man with a garage on his place.

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Kawneer

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will show up this building—or any other—at its best. Since Kawneer Fronts were invented, some twelve years ago, over 75,000 have been installed. This proves their worth from an architectural and sales-pulling standpoint.

You can easily realize that the profitable installation of Kawneer Store Fronts is not confined to new buildings. The more antiquated the structure, the more receptive the owner is to the idea of modernizing it by the Kawneer method.

We help you in every way possible to make the job satisfactory. Service has been a big reason for Kawneer progress. Besides putting out the best material, we make every effort to design the proper front for the building in question.

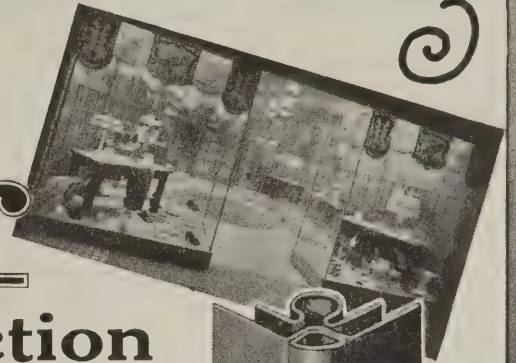
Our designers—experts—are ready to cooperate with you in every problem of store-front installation.

Write for Beautiful Catalogue

KAWNEER MFG. COMPANY,

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This shows a patented Kawneer feature. The corner bar—copper or bronze—holds the plate glass with a rugged but resilient grip that defies all winds.

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METAL LATH
Because Metal Lasts



The Government Urges More Building

STUCCO construction over Sykes Metal Lath can be completed quickly, permanently and reasonably. It permits of sufficient variations to allow expression of the personality of the builder, when desired, and has a coziness and hominess. Sykes Metal Lath is especially fitted for this kind of work; it is a heavy lath, requires no furring strips, and cannot be applied wrong.

Sykes Metal Lath is for interior work as well. Write us for free sample and book of specifications

Sykes Metal Lath & Roofing Co.
502 Walnut Street Niles, Ohio

EXPANDED CUP **SYKES** METAL LATH



GRIFFIN

The finishing touch that adds to the desirability of a home and completes the satisfaction of your customer is epitomized in "GRIFFIN"

Pressed Steel Door Stops

No. 640

The installation of Griffin Door Stops not only adds to the beauty of a home but also keeps it beautiful, inasmuch as they prevent the walls and foot boards being marked and scarred by the banging of doors.

Drawn from one piece of Cold Rolled Steel, they represent the utmost in quality and dependable service and are without exception the strongest door stops on the market. Guaranteed indestructible.

The bumper is made from the best grade of rubber. And it cannot work out of place, because it is backed up by a metal disc which is knurled in position and will stand any amount of banging.

Griffin Stops are finished in any of the Griffin hardware finishes to match the other hardware in the home.

Ask for prices, circulars and complete information today!

The Griffin Mfg. Co.
Erie, Penn.

30 Warren St., New York
17 E. Lake St., Chicago



HODGES ELECTRIC STUCCO MACHINE

*for Applying Plaster, Stucco,
Waterproofing and also for
Projecting Concrete Aggregate*

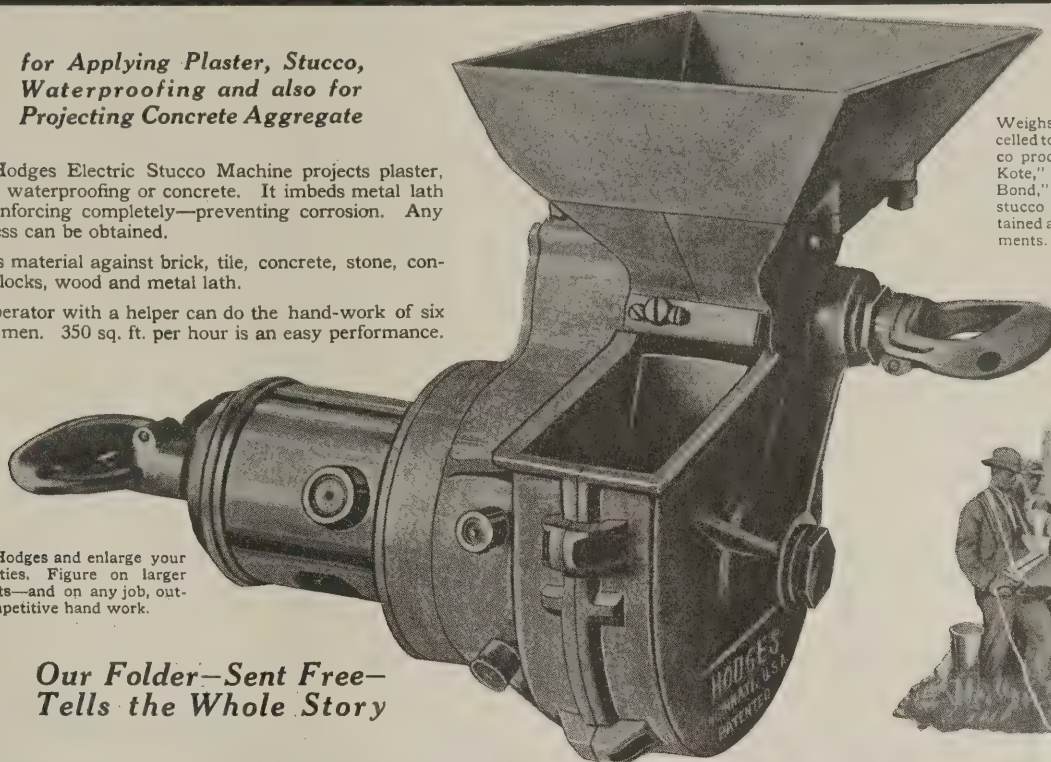
The Hodges Electric Stucco Machine projects plaster, stucco, waterproofing or concrete. It imbeds metal lath and reinforcing completely—preventing corrosion. Any thickness can be obtained.

Applies material against brick, tile, concrete, stone, concrete blocks, wood and metal lath.

One operator with a helper can do the hand-work of six skilled men. 350 sq. ft. per hour is an easy performance.

Use a Hodges and enlarge your capabilities. Figure on larger contracts—and on any job, out-bid competitive hand work.

*Our Folder—Sent Free—
Tells the Whole Story*



Weights 25 pounds. Unexcelled to apply cement stucco processes; also "Stone-Kote," "Kellastone," "Roc-Bond," etc. All kinds of stucco effects can be obtained according to requirements.



HODGES STUCCO MACHINE CO. Union Central Tower—Dept. E., Cincinnati, Ohio

DISSTON VICTORY HANDSAW

**It is significant of the times
and marks the highest, most
efficient and finest handsaw
ever made.**

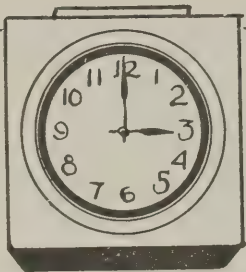


*Established
1840*



HENRY DISSTON & SONS, Inc.

Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.



This workman has been scraping since seven-thirty this morning. It is now three o'clock and he has scraped 125 square feet. His wages so far amount to \$3.50 to \$4.

This is the hand method. Hard and tiresome and not nearly so satisfactory as machine work. Usually there are waves and chatters in the floor.



You Can't Afford to Get Along Without the American Universal Floor Surfacing Machine

Tremendous savings are possible on floor scraping. In one day an ordinary laborer with an American Universal Floor Surfacing Machine can save \$20 to \$25 over what it would cost to have a number of skilled men accomplish the same work by hand.

As easy to operate as pushing a carpet sweeper. And the result? Smooth floors, absolutely free of all waves and chatter marks. Compare this method with hand scraping! Isn't it high time to change?

Do you want positive proof that the American Universal Floor Surfer will not only earn its cost many times over but does the finest work? Write!

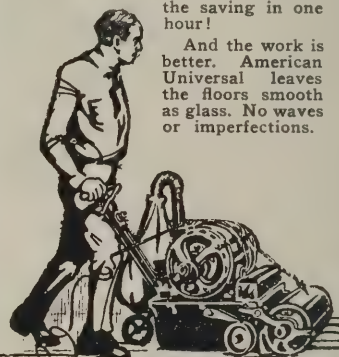
American Floor Surfacing Machine Company
TOLEDO, OHIO



This workman also started working at seven-thirty. In one hour—at eight-thirty—he has accomplished as much as the hand workman at three in the afternoon!

His wages for one hour are about sixty cents. Add to this the cost of power and garnet paper—15 cents—and you have a total of seventy-five cents. The difference between seventy-five cents and about \$4 is the saving in one hour!

And the work is better. American Universal leaves the floors smooth as glass. No waves or imperfections.



Get the Free Service of a Great Heating Engineer

POOR home heating often reflects on the builder. Let us insure the successful heating of the homes you build by having the furnace installation planned by our chief heating engineer, Mr. V. W. Cherven, admittedly America's foremost home-heating engineer. During the war, the United States Government selected Mr. Cherven as Superintendent and General Inspector of Heating and Ventilating of all its Industrial Housing projects. His services are given free with the



MR. V. W. CHERVEN
Chief Heating Engineer for the Holland Furnace Co.

Formerly Superintendent and General Inspector of Warm-Air Heating of all Government Industrial Housing projects.

HOLLAND

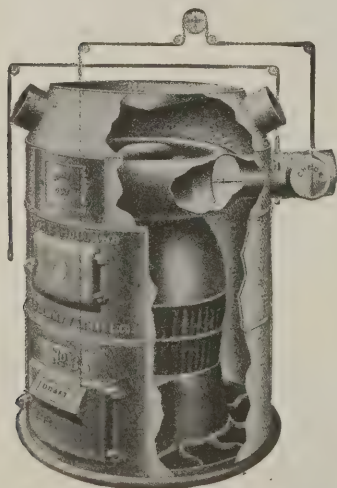
The Furnace With the Cone Center Grate

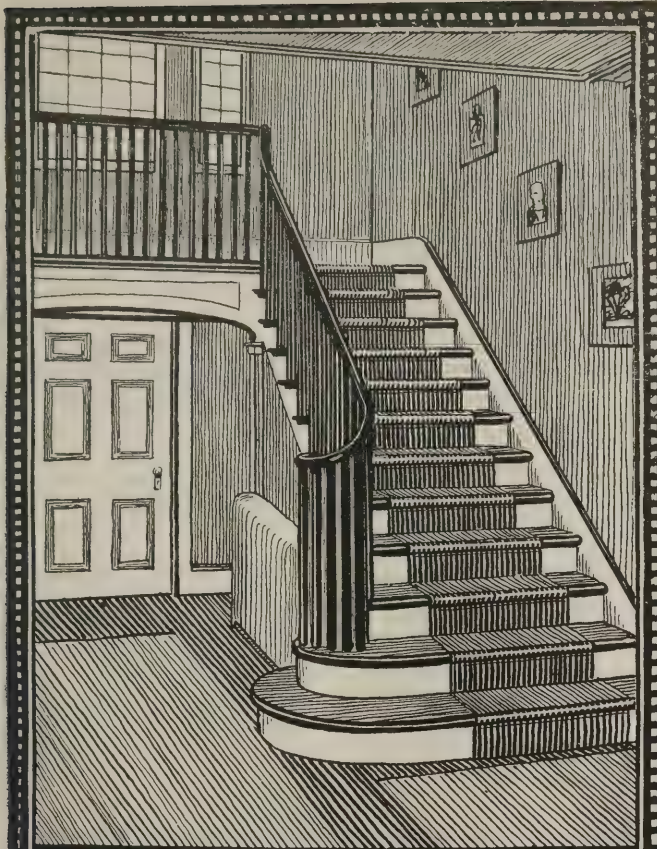
Instead of a lot of parts, the HOLLAND Grate is all one piece. Instead of sagging in the center, it is cone shaped. It throws the fuel to the outside, where it burns from the sides and over the top, which means 100% heat radiation. HOLLAND Furnaces are built without bolts and with less joints than any other furnace made. They are backed with a permanent guarantee covering all material and workmanship.

HOLLAND Furnaces Make Warm Friends

The HOLLAND Furnace has over 100,000 satisfied owners. It is now outselling every other furnace in America. We have a special proposition for contractors, builders and carpenters. Write and let us tell you about it.

HOLLAND FURNACE COMPANY :: *World's Largest Installers of Furnaces*
Two Factories: Holland, Mich., and Cedar Rapids, Iowa. 150 Branches in Central States





Starrett Scrapers



For the Finishing Touches of Stairs, Floors and Other Interior Work

The simplest and best all around scrapers on the market. They have eight sharp, smooth cutting edges—any one of which can be brought into use by means of a simple turn of the handle.

Blades can be set any angle to enable the user to get into corners without bruising knuckles.

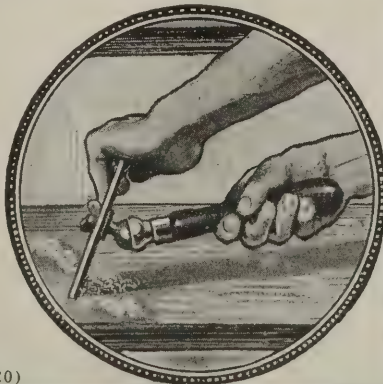
Write for Catalog No. 21M.
It shows many other styles
and sizes of fine Starrett Tools

The L. S. Starrett Company

The World's Greatest Toolmakers. Manufacturers of Hack Saws Unexcelled

Athol, Mass.

NEW YORK
LONDON
CHICAGO



(42-920)

FREE LESSON

Plan Reading For Builders

Just mail the coupon and this lesson in Reading Blue Prints will be sent prepaid. Nothing to pay for it now or at any future time. It will show you how the experts of Chicago Technical College teach men in the building line to read all kinds of building plans as easily as you read these words. You know how important it is to be able to do this if you want to get higher up. Every man who wants to take charge of work and to draw big pay must know how to read Blue Prints. This lesson will also show you how well qualified you are to learn before you decide whether to enroll in the course or not. Just sign and mail the coupon below—today.

Building Course On Easy Payments

The Chicago "Tech" experts will also give you thorough training in all branches of building. A workman with this information is ready to step into a foreman's job, the foreman to become a superintendent and the superintendent to figure on contracts. Read the following outline and see how much you or any other man can get from our complete Building Course.

PLAN READING

How to read a building plan. Use and meaning of different lines on the plan. How different materials are shown. How to read dimensions. Detail drawings. How to lay out work from the plans. Practice in reading complete plans, etc., etc., etc.

CONSTRUCTION

Brick work, stone work, concrete, all fully explained.
Carpentry: Kinds and uses of woods in all classes of construction, etc. How plans are made. Complete instructions illustrated by working blue prints.

Plans and specifications. Residences, apartment buildings, factory buildings, school houses, hospitals, stores and office buildings, bank buildings.

ESTIMATING

Practical rules. Problems worked out from the plans. Brickwork and carpentry. Excavations. Labor and material for all classes of building—millwork, plumbing, sheet metal, heating, wiring, etc. Complete instructions for figuring costs on all classes of building work. Methods of practical builders. Re-inforced concrete—full plans and specifications.

Learn By Mail

Hold your present job. Get all this in your spare time. Don't lose even an hour's work. We will teach you by mail. Every lesson given in plain language. Enrollment also gives you our Free Consulting Service. Ask us questions at any time on things about building. Our experts will gladly help you.

Small Fees, Easy Terms

No big money to pay at any time—only small payments monthly as you go along—and the whole cost is very moderate. Your increased earnings soon bring it back.

Send the Coupon

Get this information now. Learn how to make more out of your work or out of your business by knowing more about it. All this information is free. Send while this offer lasts. Whether you decide to take the course or not you ought to get this Lesson and see what it teaches in Plan Reading. Sign and mail coupon.

CHICAGO TECHNICAL COLLEGE, 537 Chicago "Tech" Building, Chicago

Without obligation on my part, send me the Free Lesson in Plan Reading, also information on your Builders Course in Plan Reading, Estimating, etc.

Name.....

Street.....

City..... State.....

Present Occupation.....



The Screened Porch Appeals to Women

ULTIMATELY it is the woman who makes the most use of the home. It is she who knows best the need of the screened sun and sleeping porch, and the benefits derived from out-of-door living and open-air sleeping, and the need of protection against disease carrying flies and mosquitos.

UPON HER AND HER MANAGEMENT depend "Domestic Efficiency." Consideration of her when you call for porch work will build business for you. Our blue print plan, sent free for the asking, will aid you in securing the order. An early season warrants prompt action. Send for it now.

A MOST IMPORTANT APPEAL is cleanliness. PEARL Wire Cloth, because of its smooth coating and even meshes, allows no accumulation of dust, dirt or germs. It is due to this metallic coating, a special process owned and controlled by us, that PEARL is longest lasting—therefore costs less in the long run besides needing no painting or repairs.



INSIST UPON THE GENUINE

It has two copper wires in the selvage and our red tag on every roll.

Call on our local dealer or write direct for samples and literature if you're interested in screen material.

Address Dept. "B"

The Gilbert & Bennett Mfg. Co.

New York Georgetown, Conn. Chicago Kansas City

G & B "PEARL" is made in two weights—regular and extra heavy. The best hardware dealer in your city sells "PEARL"

SLATE ROOFS

Get Ready for the Building Boom

The readjustment period is well under way and competent authorities state that the greatest building boom in history is in sight.

Are you prepared for it? We suggest that you anticipate your needs and order as far in advance as possible.

We have completed our war-time output for the Government and are ready to supply your needs promptly.

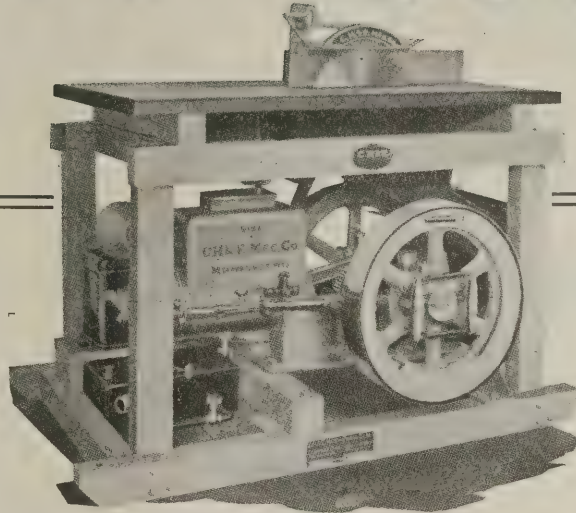


VENDOR SLATE CO.
Largest Shippers of Roofing Slate in the World
BANGOR, PENNSYLVANIA



C. H. & E. Portable SAW RIGS

*Nine
Complete
Sizes*



*No. 8 Portable
Saw Rig With 4 h. p.
Gasoline Engine*

**Also Hoists,
Mortar
Mixer
and Elevator**

**Gasoline
and
Kerosene
Engines**

WRITE FOR NEW CATALOG

C. H. & E. MANUFACTURING CO. 319 MINERAL STREET
MILWAUKEE, WIS.

“That house was constructed entirely of advertised materials”

said a builder. “Every component part has advantages over the house that is built of chance selections.”

Of course! Advertised goods have exclusive features which make them worth advertising—or they wouldn’t be.

Try this successful idea—a house, office building, store, barn or garage—made entirely of well-advertised materials and furnishings exclusively.

“You’ll like it”

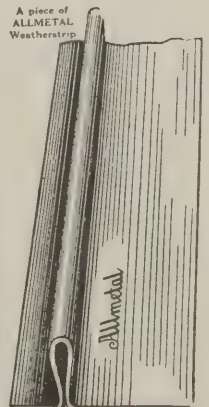
**EASY to SELL and
INSTALL**

Weatherstrips are in demand practically the whole year round. Even though the season be summer, there is always autumn and winter ahead.

Prudent people will welcome your suggestion of installing

**Almetal
Weatherstrips**

They add to the appearance of any building or home. They ward off illness and save 25 per cent of fuel bills. The cost is trifling. Yet your profit is liberal, indeed!



Information

in detail, including our new advertising plan, will be gladly sent immediately upon request. We will not only have the best of all weatherstrips to offer but also literature which you can mail to your prospects. Send your inquiry to the

ALLMETAL WEATHERSTRIP CO.
230 W. Madison St., Chicago, Ill.

for
Stores, Offices
and Homes

Hopson Metal Ceilings and Sides

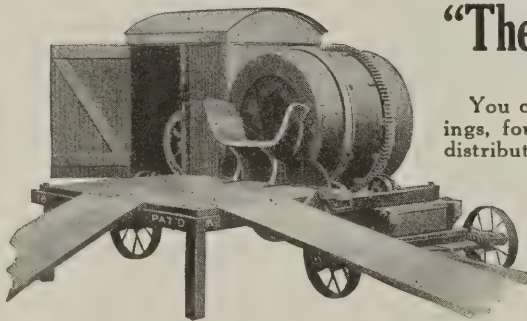
The right ceiling—a problem that often confronts you. Solve it with Hopson Metal Ceilings. Easy and economical to install—and unexcelled for handsome effect.

Our new line of steel ceilings is original in design and decorative to a degree never before attained. The requirements of the builder as well as the preferences of the owner have been skillfully embodied in our products.

Our catalogue—loaded with beautiful illustrations—shows what we have to offer. We hope you will

Write for a Copy Today

W. C. Hopson Co., 501 Ellsworth Ave., Grand Rapids, Mich.



"The Standard" Low Charging Concrete Mixers

Cut Costs—Increase Production

You can work "The Standard" Mixers on Jobs of any size. On big jobs of buildings, foundations, columns, and floors, the flexible "The Standard" Mixers may be distributed over the job close to the forms—or assembled in a battery at a central tower plant.

The low charging feature means quick, convenient charging. The elimination of high charging devices means the elimination of expensive delays due to breakdowns.

The light weight and easy portability of "The Standard" Mixers aid your foremen to RUSH a job.

A copy of our latest catalogue gladly sent on application. Ask for catalogue No. 32.

The Standard Scale & Supply Company

1631 Liberty Avenue, Pittsburgh, Pa.

New York
145 Chambers St.

Philadelphia
523 Arch St.

Chicago
163-171 N. May St.

Cleveland
1547 Columbus Rd.

Baltimore
409 N. Gay St.

The Advertisements In This Issue



Builders: The advertisements in this issue are of reliable, well-worth-while products that you can advantageously use in the structures that you should

"Build Now!"

They are fair-priced materials sold by far-sighted men—men who know that the time to begin building is TODAY.

Prices are not going to decrease

for a long time to come—if ever. Prospective home-owners are coming to this realization. They see that building materials have risen only commensurately with all other commodities.

The demand for housing is tremendous—unparalleled in history. This housing hunger will not balk at fair present prices. Necessity is too great.

Therefore we cannot urge you too strongly to buy products advertised in this issue to use in building now!



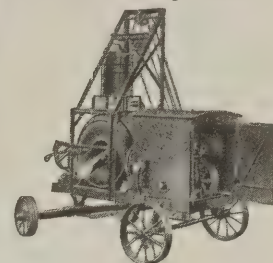


Bulletin No. 10 gives complete information. Write for it today.

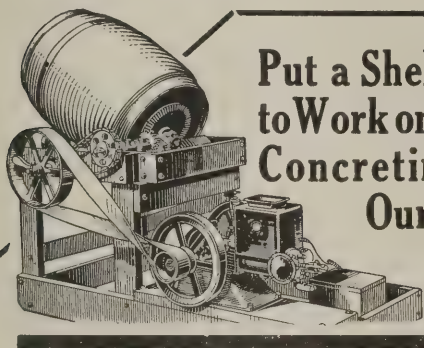
NORTHWESTERN MIXERS

Simple, safe, strong and sturdy. Unequalled for speedy, thorough, economical mixing. Anyone can operate these mixers. ENGINE is frost-proof, fool-proof and durable. Burns gasoline or kerosene. Cuts down fuel bills. A try-out will demonstrate the speed and service. We have distributors in every state.

*Price and Performance
Will Please Every Buyer*



Northwestern Steel & Iron Works
EAU CLAIRE, WIS.



Put a Sheldon Mixer to Work on Your Next Concreting Job At Our Risk

You don't have to take our word for a single claim or statement made for the Sheldon Mixer. Send for the style Sheldon you need today. Give it the toughest test you can think of. Keep

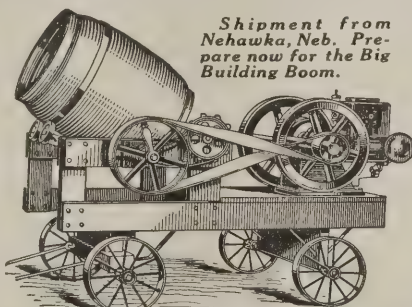
track of the amount and kind of work it will do. Keep track of what it will save you over hand mixing. Then at the end of thirty days if it does not sell itself to you on its merits, ship it back. We know it will convince you, that's why we take all the risk. **Accept this offer today.**

Don't Pay \$200 to \$500 for a Mixer

The Sheldon will do just as good work at only a fraction of the cost. Mixes 3 cu. ft. to a batch. Will keep one to six men busy. Pays for itself on the first small job. Thousands in use by contractors for the last five years.

Write for Catalog and Trial Order Blank Today

The illustrated catalog tells you a lot about concrete work and shows all styles and prices of Sheldon Mixers. You can't afford to pass by this opportunity to get a Sheldon Mixer and cash in on the extra profits that you can make on concrete work. Write today, a postal will do. Address



*Shipment from
Nehawka, Neb. Prepare now for the Big
Building Boom.*

Sheldon Mfg. Company
Box 2058 Nehawka, Neb.

Contractors Be Your Own Brick Maker

Be independent of the clay brick manufacturer and dealer—don't be held up by annoying delays—whittling your profits down to nothing. Put yourself in position to take more business and make more money on your contracts. Hold your crews together in your own brick and block plant when not out on contracts.

You can offer your trade better brick and more kinds by operating a



Helm Brick and Block Press

and making PRESSED cement brick and blocks. Each brick is perfectly true and uniform, made in various colors and shades, including the granite effect. Lay rapidly—easily cut—do not require gauging. A comparatively small investment gives you a plant of

**10,000 Brick or 1,000 Blocks Daily Capacity and
\$10.00 to \$50.00 Daily Profit**

To men actually interested we want to send our book on building by the Helm DRY WALL System, and on Helm Presses of various sizes and types.

Send the coupon attached to your letterhead

The Helm Brick Machine Company, 585 Mitchell St., Cadillac, Mich.

The Helm Brick Machine Co.,
585 Mitchell St., Cadillac, Mich.

Please send your free book.

Name _____

Address _____



BOLTE BATCH AND CONTINUOUS MIXERS

Bolte Mixers have been made since the concrete mixers were invented. We are one of the pioneers. During the years Bolte Mixers have been on the market, thousands have been distributed all over the United States. And today nothing but good is spoken of them.

Bolte Mixers have four actual features that will strongly appeal to you: Capacity—Portability—Simplicity—Durability.

Our literature illustrates and explains both "Bolte" and "Handy" Mixers. Ask and we will send it immediately

THE BOLTE MFG. CO.
KEARNEY, NEBRASKA

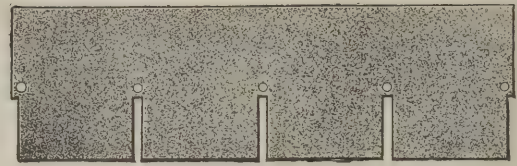
Is it possible to get all the desirable qualities in one Wall Board and in addition a low price?



*If you want to know—write for
Wall Board Facts.*

Plastergon Wall Board Company
Manufacturers of the "Quality" Board
Department D Buffalo, N. Y.

REX STRIP SHINGLES



Asphalt-Slate Covered

STRIP SHINGLES cost less than Individual Shingles, and according to definitely established figures there is a saving of 37½% on the nails and on the labor of nailing.

Samples and Catalog on Request



The Flintkote Company

Asphalt Shingles Prepared Roofing

89 Pearl Street, Boston

New York

Chicago

New Orleans



CONTRACTORS, builders and carpenters in all parts of the United States continually express their satisfaction with this material when used for roofings, porch decks, sleeping verandas and bungalow construction.

It is furnished in such widths and weights as are best suited for various classes of work; thus practically all waste is eliminated.

Every carpenter, builder and owner should send for our new illustrated booklet "Roofing Facts and Figures." It proves the many advantages of Con-Ser-Tex Canvas Roofing.

Wm. L. Barrell Company

8 Thomas Street

New York City

Chicago Distributor: Geo. B. Carpenter & Co., 430-440 N. Wells St.
California Distributor: Waterhouse-Wilcox Co., San Francisco and Los Angeles

A Huther Bros. Dado Head

enables you to do the most intricate



cutting easily. It consists of two outside cutters and enough inside cutters to make the required cut. It will cut perfect



grooves of any width either across or with the grain. Is easily kept in condition and has a simple quick adjustment. Will fit any saw manderel. Send for one on approval and return at our expense if not satisfactory.

Patented
Nov. 29, '92
July 19, '10

Illustrated Catalogue on Request

GROOVES
CUT WITH
HUTHER
BROS.
DADO
HEAD



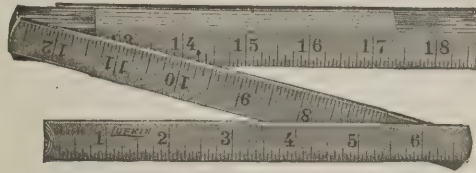
Huther Bros. Saw Mfg. Co.

1105 University Ave.

ROCHESTER, N. Y.

LUFKIN MEASURING TAPES

Spring Joint and
Boxwood Rules



On Sale Everywhere
Send for Catalogue

THE LUFKIN RULE CO.

New York

SAGINAW, MICHIGAN

Windsor, Canada

All up to the high quality standard, which, for years, the name has implied

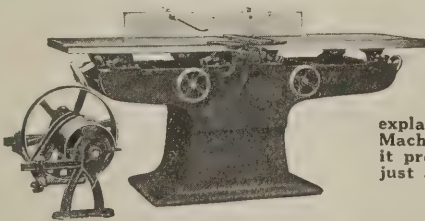
SILVER

Band Saws, Jointers,
Saw Tables, Swing-
Saws, Etc.



We gained our first customers by our moderate prices. We held these customers and gained new ones by a continuation of the fair-price policy and by the splendid performance of the machines themselves.

THE SILVER MFG. CO.
Box 340 Salem, Ohio

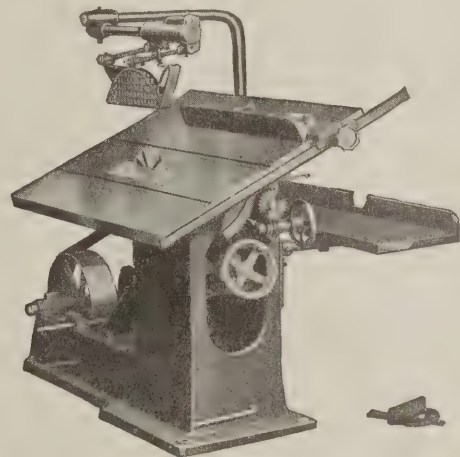


Catalog
No. 63

explains every Silver Machine. We'll send it promptly if you'll just ask for it.

CRESCENT Wood Working Machinery

is built for continuous, exacting service and always meets the requirements of those particular users who want the best.



Send today for catalog of band saws, jointers, saw tables, planers, planer and matcher, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood worker.

The Crescent Machine Co.

10 Main Street

Leetonia, Ohio

Barnes Hand and Foot Power Machinery

Complete Outfit for CARPENTERS AND BUILDERS

Improved Former has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Improved No. 7 Scroll Saw

Warranted to be well made; will saw pine three inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. Price, \$20.00.

We make Sixty Styles of Knives
SEND FOR NEW CATALOG

W. F. & John Barnes Co.

436 Ruby Street

Rockford, Ill.





Copper

Conductor Pipe and Eaves Trough, Roofing Copper, Cornice Copper, Elbows and Shoes, Slating and Shingle Nails, Soldering Coppers, Mitres, Gaskets.

The best metal for roofing, spouting, and cornice work

C. G. HUSSEY & CO.

Pittsburgh Copper and Brass Rolling Mills
Pittsburgh, Pennsylvania

Saves Precious Time

— without sacrificing thoroughness and permanence of construction. The speed demanded in adapting your business permanently to peace-time need will be greatly aided by the use of



Do not confuse this with other wall boards. It is superior in strength, durability, moisture-proofness and its ability to keep out cold in winter and heat in summer, because it is made with a center core of kiln-dried wood slats.

It doesn't warp, shrink or buckle, even if papered. It saws with smooth edges, doesn't need to be paneled. Use any decorative scheme with it.

The genuine Compo-Board has the wood core and the name printed on the surface.

Write for sample and interesting booklet

The Compo-Board Co.

5776 Lyndale Avenue North
MINNEAPOLIS, MINN.

Sanitary Chemical Toilets



—No Germs
—No Odor

A Modern Convenience — A Real Necessity

**Carpenter and Contractor Agents
Make Big Money Representing Us**

Sales Easily Made. Profits Liberal. You sell the first one. It will sell the rest. Every home without sewer connection needs one.

**Price \$20.00
To Agents \$12.00**

In lots of two or more, \$10.00 each. Order from this ad at Agents' price. Use it 30 days. If unsatisfactory, return it. We will cheerfully refund your money.

**Chemical Closet
Supply Company**

Box 209 Jackson, Mich.



Mr. Contractor—

*A point to remember—Increase
your income this month*

Here's an opportunity to make bigger profits for yourself—a Chemical Closet which you can sell to home builders with a profit at a less price than the wooden privy.

Economy Chemical Closet

The world's best. A sanitary indoor closet which can be set up in the best room in the house—positively kills all germs and odors. It does away with the outdoor privy, and the NU-WAY gives comfort and convenience where there are no sewer connections.

Agents Wanted

We want one live contractor or builder in each town to act as our agent. Good profits on your sales. We assist you to sell them.

The Economy is in great demand. Hundreds of homes have installed them this winter. Write today for catalog and complete details.



Sanitary Chemical Closet Co.

41-E Bacon St.,

Hillsdale, Mich.



THIS BUILDING

was the subject of the Special Supplement in the April issue of National Builder and

This Hardware Co. (*Occupying It*)

has been the subject of many national write-ups. If you're not acquainted with our method of doing business—better get acquainted and save money by buying your Builders' Hardware at Wholesale. We sell practically all the Standard Lines of Builders' Hardware for Homes, Flats, Public Buildings and Garages, advertised in this magazine. Write NOW for Catalog No. 6 and send in your lists for estimates. We save you money.

NICHOLAS HARDWARE COMPANY

5514 W. Lake St. WHOLESALE HARDWARE Chicago
SUCCESSORS TO REHM HARDWARE CO.'S BUILDERS' HARDWARE DEPT.

FLOORS

The Wood Mosaic Kind



For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood-Carpet, strips, Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalog

Wood-Mosaic Company
New Albany, Indiana



New Mill

Lumber and Millwork

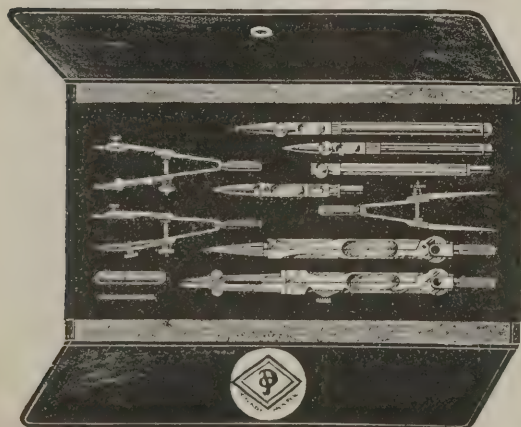
For Immediate Shipment
Out of St. Louis

Avoid Delay and Trouble

Write for Prices

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MONEY BACK GUARANTEE



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1—5" Ruling Pen	1—5 1/2" Compass with
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The Peerless Blue Print Company
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No other refrigerator has as many valuable features as the Herrick—it is in a class by itself. This is why you are safe in specifying this master refrigerator. Wherever a Herrick is installed, refrigeration troubles disappear. This does not surprise us, for more money is spent on Herrick improvements than most refrigerator manufacturers think necessary.

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The Herrick is built to last a lifetime. The features of perfect air circulation and double insulation alone make it the ideal refrigerator. When you specify the Herrick you secure not only these valuable features, but many others in addition. See March Good Housekeeping for information on Herrick Outside Icing.

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Herrick Refrigerator Co. - Waterloo, Iowa

There's a Place for UNIVERSAL INSULITE

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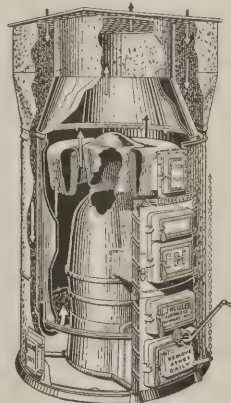
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The Mueller Pipeless Furnace has proved its efficiency, economy and absolute reliability in thousands of homes in the coldest parts of the United States.

Builders and contractors can recommend it with assurance.

MUELLER PIPELESS FURNACE

The Mueller's remarkable record is due to the fact that, in every part, it is correctly and scientifically proportioned in accordance with the laws of pipeless heating efficiency. It is guaranteed to heat every room of the house comfortably.



Burns hard or soft coal, lignite, coke, wood, gas or oil with remarkable economy, saving one-third to one-half on fuel.

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FURNACE CO.**

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Makers of Heating Systems of All Kinds Since 1857

Dahlquist Copper Boilers

are used in homes, hotels and institutions. Ours is the largest factory in the United States producing copper tanks.

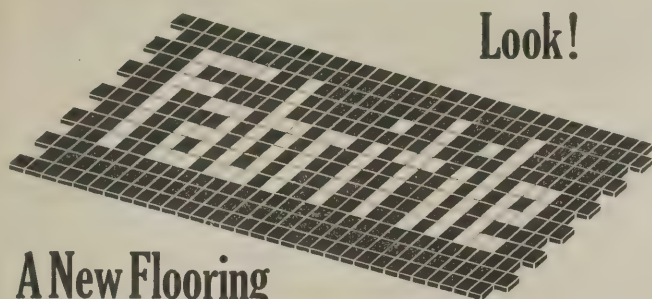
We build copper tanks and boilers for pressures as high as 600 pounds. If you require special construction, we can give service and prices to suit your conditions.

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Dahlquist Mfg. Co., 42 W. Third St., Boston, Mass.



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A New Flooring

*—wonderfully attractive—
surprisingly low in cost!*

FABRITILE is an artistic, durable marble-cement tile flooring made up in sheets. Each tiny tile is held firmly in place by a fabric base which is incorporated in the tile itself.

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The 14x24 inch sheets are flexible and easy to handle. They can be laid in one-third the time it takes to lay ordinary tile floor. It is made in a standard variety of colors, and any special tints desired will be made to order.

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Despite the fact that FABRITILE is superior in beauty and wear, it costs less than any other strictly tile flooring. Combine the savings of its cost with the savings of laying it and you have a remarkable saving.

Samples and Specifications Ready

The Richards Floor Tile Co.
Swanton, Ohio



Build Yourself a Business

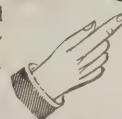
Here is a chance to build up an independent, profitable business for yourself right at home. Many of our agents are now devoting their entire time to selling our metal roofing. Others have made big profits simply devoting part of their time to selling and laying our Metal Spanish Tile and other styles of Metal Roofing.

Edwards' Metal Spanish Tile

Architects are specifying Edwards' Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.



Don't delay; write today for new roofing catalog and special agent's proposition



Note the construction of patented interlocking device protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

THE EDWARDS MFG. CO. 430-450 Eggleston Ave.
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The World's Largest Manufacturers of Metal Roofing, Metal Shingles, Metal Spanish Tile, Metal Ceilings, Metal Garages, Portable Buildings, Metal Lockers, Rolling Steel Doors, Partitions, etc.

(3)



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STEEL CEILINGS

The Story in Book Form Fully Illustrated

THE field for Steel Ceilings and Sidewalls of Berger quality is unlimited.

This 80-page book puts before you in clear form advantages, methods of erection and suggestions for finishing, as well as illustrations of many patterns and finished ceilings.

A request to the nearest Berger Office brings it promptly.

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EXPANDED METAL LATH-FLOOR CORES-REINFORCING PLATES-METAL LUMBER
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STEEL CEILINGS-ROOFING-SIDING AND OTHER PRESSED STEEL PRODUCTS



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Hard wood floors tell the tale to your clients or prospective buyers. The transparent varnish simply accentuates the story. If you select "Eaglesfield"

Hard Wood Flooring

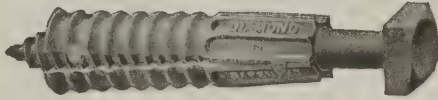
Strips, Borders and Parquetry the buyer knows you've put the best material in the building.

"Eaglesfield" Brand is cut only from the choicest flitches. The grain is superb. It is kiln-dried and is guaranteed NOT re-sawed.

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The Eaglesfield-Stewart Co.
Indianapolis, Ind.



DIAMOND Expansion Bolts

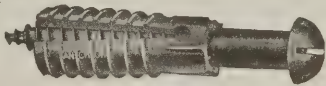


Patented

Quality exists to some degree in most expansion bolts.

Distinctive Quality is what has caused the "Diamond N" to be the most copied expansion bolt ever produced.

Examine them and you will find some of the Diamond distinctive features in all, but you will find all in none but the original.



Patented

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Mfrs. of Diamond Specialties

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For Users of Large Quantities of

For structural steel and iron, concrete walls, roofs and tanks.



Something New

A black paint with bright, glossy finish, equal in endurance to the best lead and oil paints at half the cost.

Write for full details
Booklet and Prices

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Established 1810 Seymour, Conn.



Stanley Nail Sets

☐ Made of a high grade of tool steel. Both ends hardened and oil tempered. Specially well knurled, giving the workman a feeling of security as to "grip." ☐ The point that comes into contact with the nail is "cupped" and the edges nicely rounded. Made in a variety of sizes four inches long. ☐ For sale by all hardware dealers,

Manufactured by

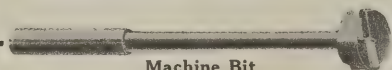
STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Sand's Aluminum Levels

Always Tell the Truth

The standard of accuracy. And not only the most accurate—but the easiest to read, even in the dark. Never rusts—cannot warp, split or crack—and are easily handled. The lightest levels made—strong and durable because the greatest strength is placed where most needed. Ask your dealer to show you these levels, and also write for our new catalog.

J. SAND & SONS. Originators of 6-glass Aluminum Levels, 1023-29 Rivard Street, Detroit, Michigan



Machine Bit

A Bit of Utility

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle and can be guided in any direction.

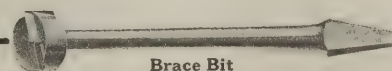
Doesn't matter how hard the wood is, no consequence whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

Unequaled for Delicate Work

Supersedes chisels, gauges, scroll-saws, or late tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and cost no more.

We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

The Progressive Mfg. Co.
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Brace Bit

Correct Steel Treatment

determines the quality of chisels and other woodworking tools. It is a delicate process, requiring not only accurate working temperatures, but skilled workmen.



D. R. Barton Tools

are made from selected steel. After forging it is treated to secure temper without brittleness. An advantage of the Mack process is that tempering is done at comparatively low heat as the metal is not "burned."

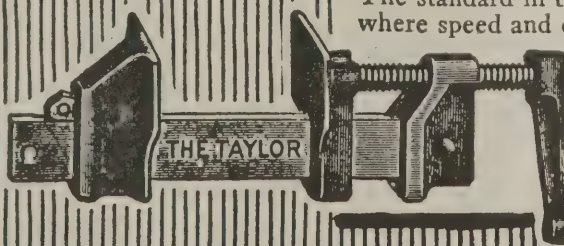
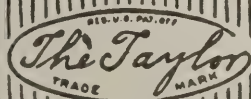
D. R. Barton tools hold their edge because of the fine tempering.

Write for "True Stories," which was written by carpenters all over the country



MACK & CO.

Brown's Race
ROCHESTER, - NEW YORK



Taylor Clamps

The standard in the U. S. Navy Yard for over 15 years and in all shops where speed and efficiency count. One user says: "Many years ago we bought a lot of Taylor Clamps and they are so good I guess they will never wear out." Let us prove it in your shop. Write for catalog showing the many styles of Taylor Clamps.

James L. Taylor Mfg. Co., Poughkeepsie, N. Y.



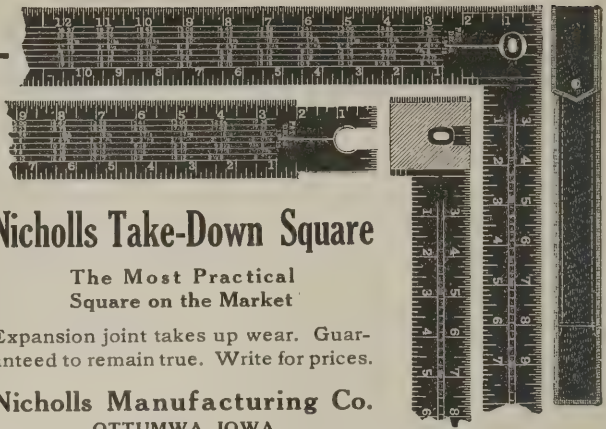
Caldwell Sash Balances Uniform Mortises

For use in all classes of new work Box frames unnecessary. Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

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Caldwell Mfg. Co., 2 Jones St., Rochester, N. Y.



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The Most Practical
Square on the Market

Expansion joint takes up wear. Guaranteed to remain true. Write for prices.

Nicholls Manufacturing Co.
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DIETZGEN Instanto Ink Remover

removes Waterproof Black Drawing Ink from tracing cloth in an instant—cleanly and effectively. The ingredients of "Instanto" positively cannot injure the tracings.

50c will bring trial bottle prepaid. Convince yourself of "Instanto" superiority.

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The famous "Interlox" Master Slide Rule gives both inside and outside measurements instantly.



Quick, accurate, no figuring, no mistakes. Durable and rust proof. Great satisfaction at a low cost. All sizes 2 ft. to 8 ft.—20 cents per foot.

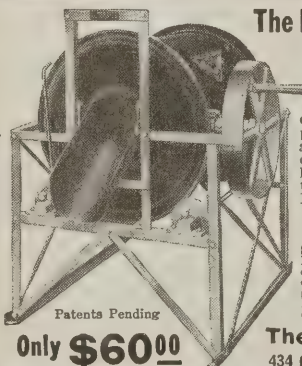
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(Formerly Dahl Mfg. Co.)

841-B E. 136th St.

New York City

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Saves its cost on one job. Capacity about 3 cubic ft. Mixes a batch a minute. Does *PERFECT* work, wet or dry, empties clean. Discharges direct to forms, cuts out the wheeling and backache. Satisfaction guaranteed or your *MONEY BACK*. Reference: Any La Crosse bank or Dun Agency. Write for circular or order direct from this adv. and avoid delays.

The Little Whirlwind Mixer Co.

434 Gould Street

La Crosse, Wisconsin

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Great Bell PIPELESS FURNACE

For big value and heating ability the GREAT BELL is supreme. Its popularity proves that.

Install pipeless furnaces because they save cost of piping and installation. And then install Bell Furnaces because they're best.

Where the building is too large for pipeless heating you cannot do better than install our Harmon Furnace.

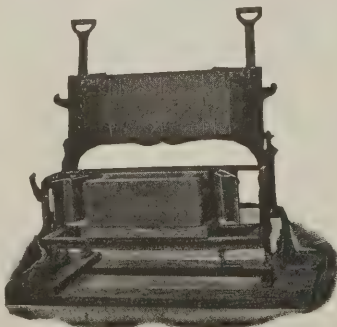
Reasons Why in Our Booklet

American Bell & Foundry Co.

Northville, Mich.



Miles Concrete Machinery



Continuous Mixers
Batch Mixers
Miles Block Machines
Singer Block Machines
Automatic Tampers

All Guaranteed

Write for our catalogs, prices and complete information

Department 7

THE MILES MFG. CO.

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Convenient Charging Means More Work

It is easy to work a Jaeger Mixer to capacity, for the low charging feature makes quick handling of materials. No machine time is wasted.

Jaeger Mixers

charge easily, mix thoroughly and stand up to a big day's work. There is no unnecessary weight to load up the engine, or make the mixer hard to move. Yet there is plenty of strength everywhere.

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250 Dublin Avenue

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Successful Roofing Contractors Buy Good Slate

Our "SLATES OF QUALITY" have stood the test for nearly fifty years. Our natural growth and success is due entirely to the good quality of our slates and the good quality of our slates is due entirely to the good grade of slate rock we fortunately own. Buy

"Slates of Quality"

direct from our quarries to you. The fact that we have been in business half a century is self evident that our prices are right, that the service we offer is right and the quality of our slates is right.

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Our book, "The Slate Roofer," is the roofer's handy guide
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REILLY'S WEATHERWAX

PATENTED
The Liquid Wax Paint

Builders Attention!
WEATHERWAX cuts your paint bills. Costs less, covers twice the surface in half the time. One painting outlasts five of best linseed paints. Enters wood deep and remains permanently. Prevents decay. Waterproofs. Flat, even finish. Non-fading colors—Red, Maroon, Dark Brown, Natural Brown (clear), Black.

Color chart on request. Send for sample can.

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Plants: Indianapolis Minneapolis Mobile Seattle Norfolk



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Send for free samples, prices, etc.
We also make solid masons' lines, chalk lines, etc.

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"ACMETYLE" SANITARY FLOORS

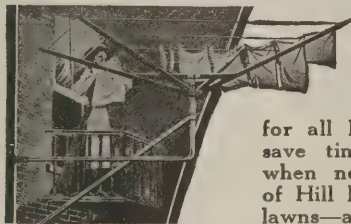
Guaranteed Your Men Can Lay

Agents Wanted Our plan means profit for you—write for catalog and samples.

Everything in Asbestos

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1343 West Kinzie Street Chicago, Illinois

Conveniences for the Home

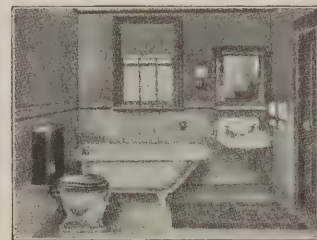


HILL CLOTHES DRYERS

for all kinds of houses. They save time and labor—fold up when not in use. Get details of Hill Dryer for balconies and lawns—also our Cabinet Clothes

Dryer for laundry rooms of residences, apartments and institutions. The Hustler Ash Sifter is another convenience for the home. Send postal for Catalog N.

Hill Clothes Dryer Co., 46 Central St., Worcester, Mass.

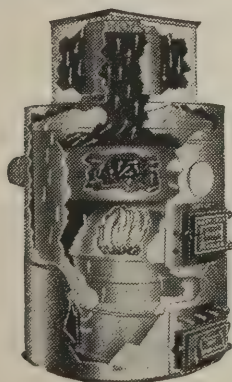


FULL LINE OF PLUMBING, HEATING AND PNEUMATIC WATERWORKS SUPPLIES

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Bovee Compound Radiator Pipeless Funace A REAL FURNACE

Sold at Manufacturer's Prices

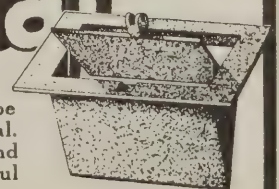
Thousands in use. Twenty-five years on the market. Burns any fuel. Double the heating capacity from fuel consumed.

Furnished with regular piping to each room when desired. Made in five sizes suitable for a cottage to a church.

Write Us for Full Description and Prices

Bovee Furnace Works
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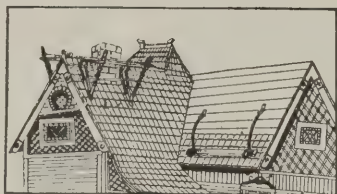
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Let your fire places be useful as well as ornamental. Install Colonial grates and equipment—both beautiful and practical.

Illustrated is our Jackson Dustless Ash Trap. It is so arranged that when ashes are dumped, the top is closed, thus preventing dust from blowing into the room.

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COLONIAL FIREPLACE CO.
CHICAGO, ILL.



FOLDING SCAFFOLD ROOFING BRACKET

Here's an adjustable scaffold for building chimneys and a bracket for roofing. Chimney scaffold folds up. Compact and easy to move about. Wonderful time and trouble savers.

Sold on ten days' trial. If not satisfactory in your estimation full price will be refunded.

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NEVILLE MFG. CO.

NEVILLE SCAFFOLD and ROOFING BRACKETS

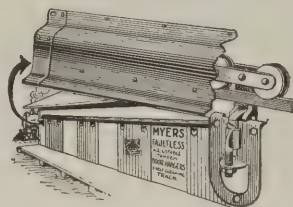
at Dennisport, Mass., says: "I have used one of your chimney scaffolds for one year and now couldn't get along without it. I advise all brick masons to get a set at once."

We have a booklet that explains both scaffold and bracket in detail, together with letters from users. A convincing bit of literature. Ask for it!

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Myers Faultless Door Hangers

For Sliding Doors on Any Building



The carpenter or builder who has contracts for the erection of new barns or other buildings, or the one who makes it a business to repair old structures, generally recommends the style of door hangers best suited for the sliding doors.

Many of them now recommend and use MYERS FAULTLESS HANGERS and SELF-CLEANING TRACK, or some of the other styles of Myers Hangers and Track, for they realize that the exclusive Myers features mean much in the way of satisfaction to their customers through the improved service Myers Hangers give.

The MYERS Line of Door Hangers no doubt has styles just fitted to your own requirements—Find out about them by obtaining a copy of our late catalog—Ask for it today and get our prices.

F. E. MYERS & BRO.

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DERRICKS and WINCHES



WE SATISFY YOU

Sasgen Derricks and Winches are built throughout with Crucible Steel and best Malleable Fittings. This makes them stronger, safer and lighter, also easier to put up. Most of our derricks can be used by hand or power. If you are in the market for Derricks, Winches, Crabs, Material Elevators,

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THE SASGEN DERRICK CO.

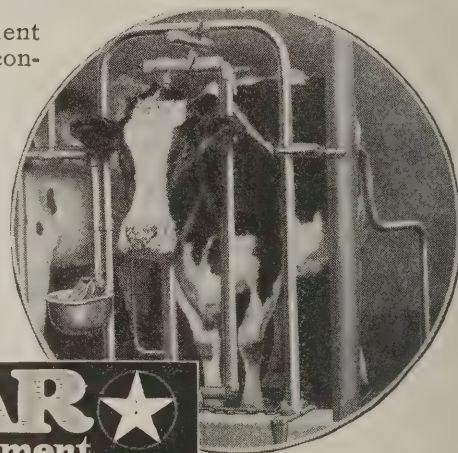
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Chicago, Illinois

STAR equipment keeps cows contented and owners satisfied. Easier to put in—saves time and work.

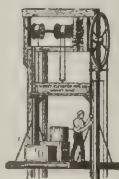
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STAR Barn Book.

HUNT, HELM,
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Harvard, Ill. Albany, N.Y.



STAR ★
Equipment

Sidney Elevators



Will reduce your handling expense, and speed up your work. Easily installed from our complete plans and instructions which are sent with each elevator. Write us today, stating requirements, giving style of machine wanted, size of platform and number of feet travel, and we will quote you a money saving price.

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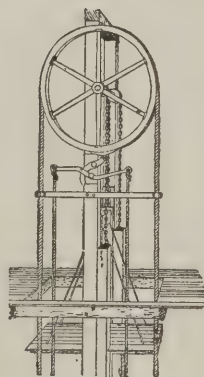
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AND
Dumbwaiters

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1100 9th St. Council Bluffs, Ia.



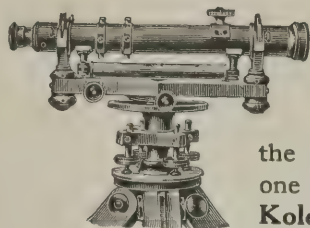
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FOR ALL PURPOSES
DUMBWAITERS
SIMPLEX CHAIN HOISTS
CRANES

Chain for All Industrial Purposes

J. G. SPEIDEL
READING, PA.

THE July Issue of NATIONAL BUILDER will be the "Home and Housing" Number. It will be highly instructive and of tremendous benefit in actually clinching jobs. Every NATIONAL BUILDER reader should read it thoroughly from cover to cover.



MANY TIMES

the errors you will avoid on one job will save the cost of a Kolesch Level.

It is a mistake to figure such a purchase as an expense.

Besides, the knowing that your work is error-proof, pays big.

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Kolesch & Co., 138 Fulton St., New York



Keeps money saving devices for carpenters and builders

Kees



Metal Building Corners

enable you to do a classy job economically and to insure tight, warp-proof joints.

Metal Barn Battens

for vertical siding give a warp-proof, rain and rat-proof method of barn construction that can't be beat.

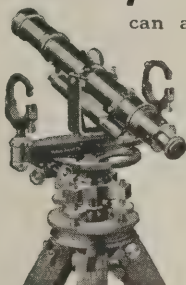


Two Items That Will Help Please Your Trade. Write Department 811 for samples

F.D. Kees Mfg. Co. Beatrice, Nebr.

No Up-to-Date Builder

can afford to be without a reliable Level.
Our 1919 Model



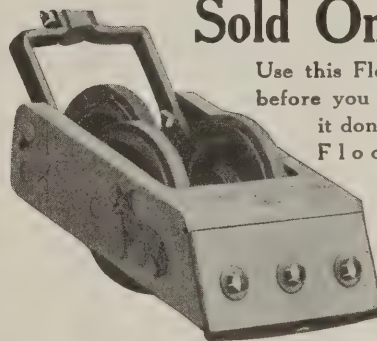
"STERLING" Convertible Level

may cost a little more at the start, but its special features will save enough valuable time to more than repay the additional outlay. Free examination privilege. Easy payment plan.

Illustrated Pamphlet D contains valuable information on the selection of up-to-the-minute Levelling Equipment. Correspondence invited.

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Vest Pocket Manual of Adjustments Free

Sold On Its Merit



Use this Floor Scraper ten days before you pay a cent on it. If it don't prove to be the best Floor Scraper you ever used ship it back at our expense.

Write for catalog, prices, etc. Made in five sizes.

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White Levels for Contractors



are accurate and durable. Use one for laying out foundations and checking results.

Sold on 10 days' trial. Check your work during the trial period, and get fully acquainted with the quality of White Levels.

Circular Free. Send your address today

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The Wayvell Chappell Automatic Ball Bearing Electric Floor Surfacing Machine

is what you need to finish your new or old wood floors quickly and just the way you want them.

Patented roller eliminates vibration also reaches all baseboards doing away with unsatisfactory work of narrow edge roller. Four sizes—for the largest areas or the smallest rooms. Built to last.

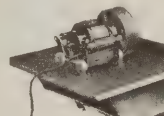


The Little Automatic Electric Surfacing Machine (on desk) is a wonder for removing varnish from desk tops, counters, etc., or for new work. Write for folders. Accept our free trial offer.

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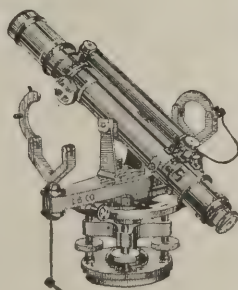
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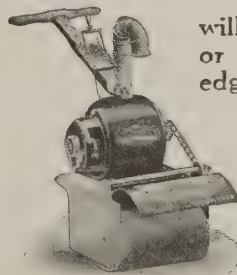
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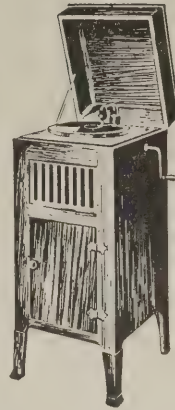
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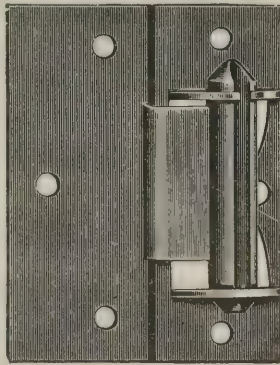
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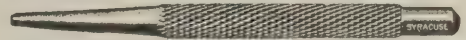
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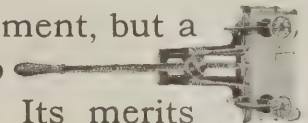
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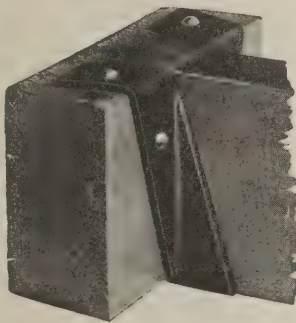


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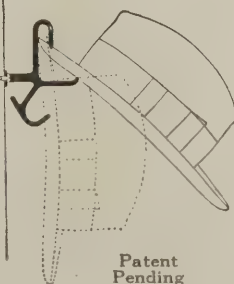
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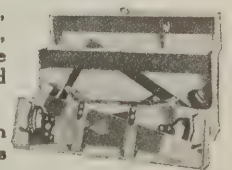


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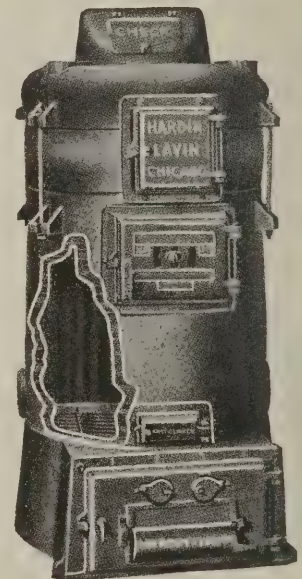
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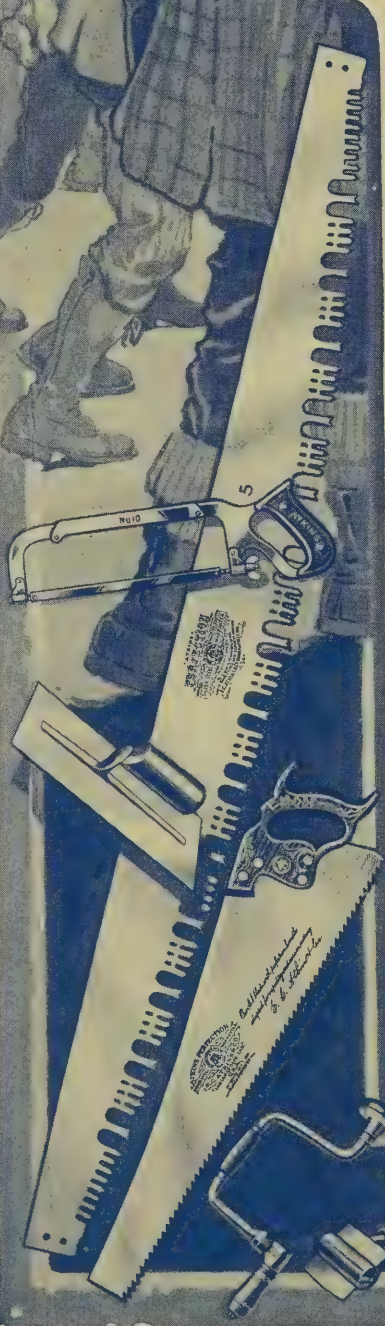
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Vol. 62 June, 1919 No. 6

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Blueprint plans of hog, poultry, milk and smoke houses, septic tanks, manure pits, hog wallows and similar concrete structures for town or country can be had for the asking.

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What would you like to know about concrete and how to use it? Simply write our nearest District Office.

PORTLAND CEMENT ASSOCIATION

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Is Merchandise Properly *SOLD* to You?

YOU recognize the direct connection between production methods and the cost and quality of the goods; you have a right to know that goods are properly made. Yet the manufacturing, important though it is, is but the first lap on the journey to the consumer. Merchandise must be sold; sales cost is just as legitimate as manufacturing cost, and it has **just as direct a bearing upon the final cost to you.** If needless expense is incurred, it means either higher prices or a decrease in quality or service.

Obviously it will pay you to recognize efficient selling service. With this simple truth clearly in mind, permit us to enunciate an established, proven sales principle—

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Each has subscribed to and is maintaining the highest standards of practice in their editorial and advertising service.

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There are many other reasons why discriminating buyers are giving preferred consideration to the concerns which tell them their business story in the buyer's own business paper, **especially** if that paper has subscribed to the high standards of practice of The Associated Business Papers, Inc.

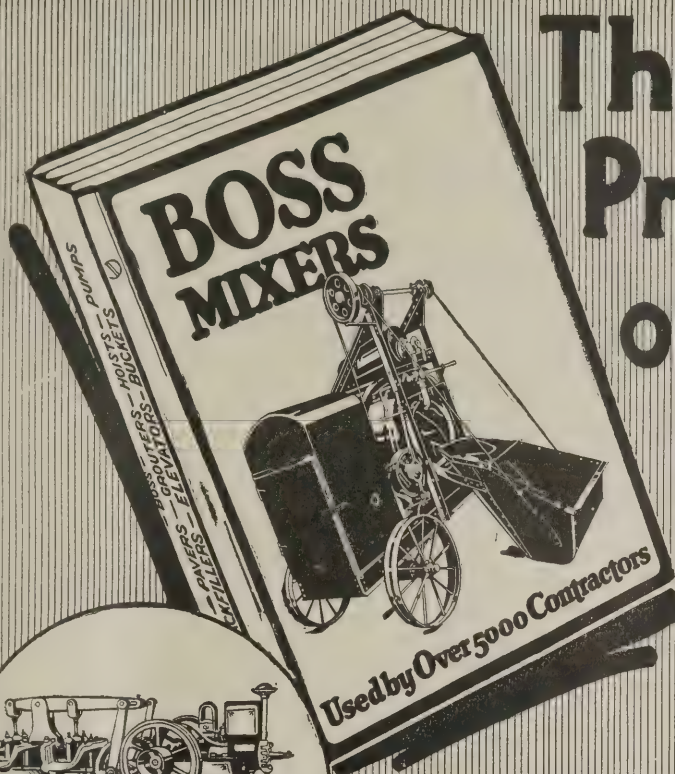
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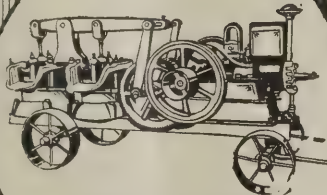
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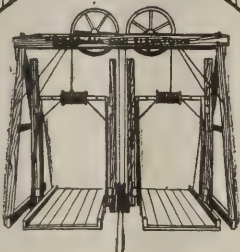
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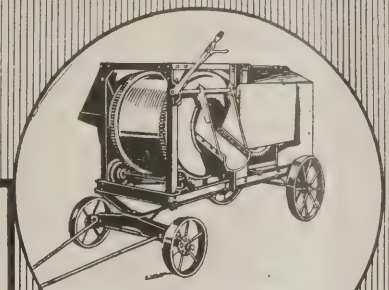
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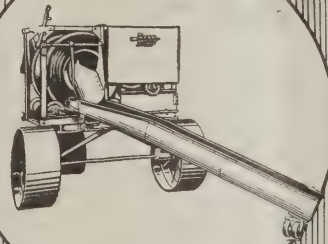
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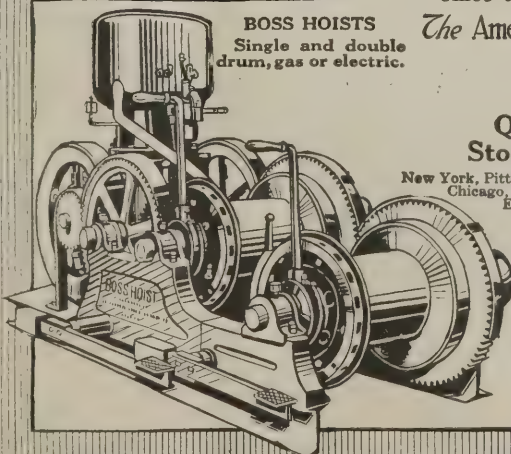
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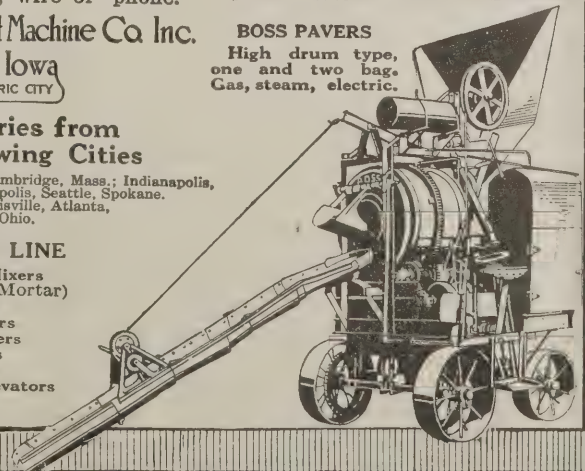


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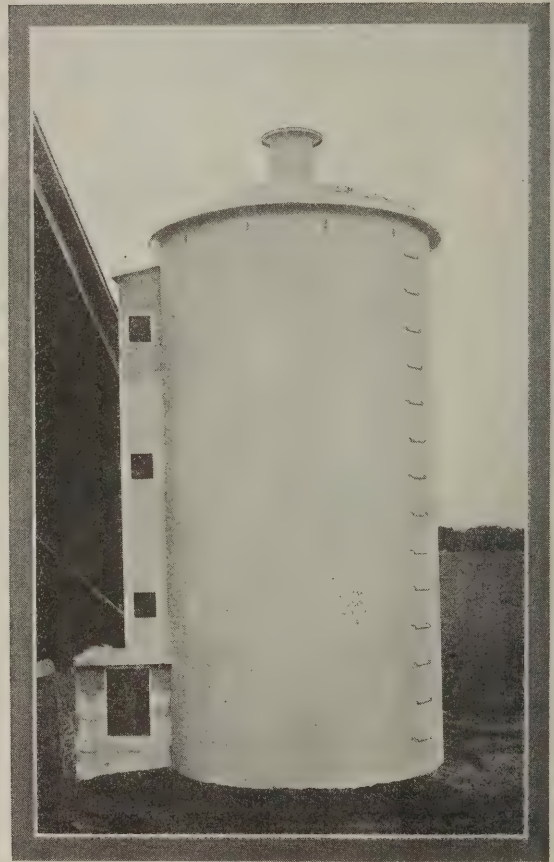
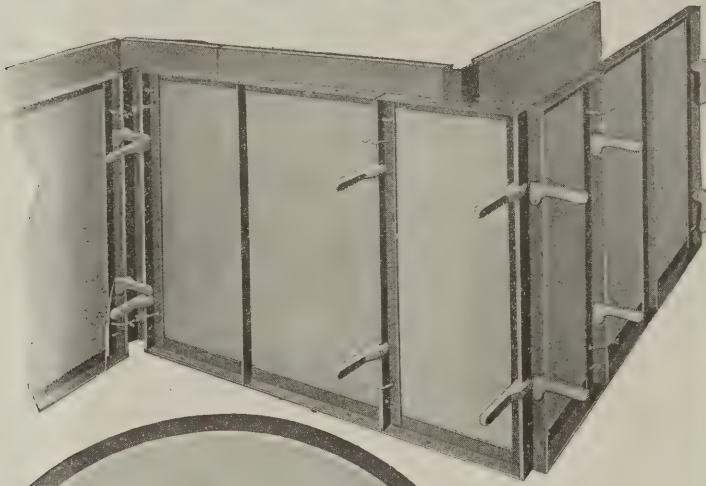
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**Last
for Years
Without Repair**

Metal Forms

When writing advertisers please mention National Builder

Outfits *for* Faster, Cheaper Concrete Work



Why employ the costly labor of skilled carpenters for wooden molds that must be torn down again almost as soon as they are put up? Why, with lumber so expensive, spoil such a terrific amount of it for only a few hours' use?

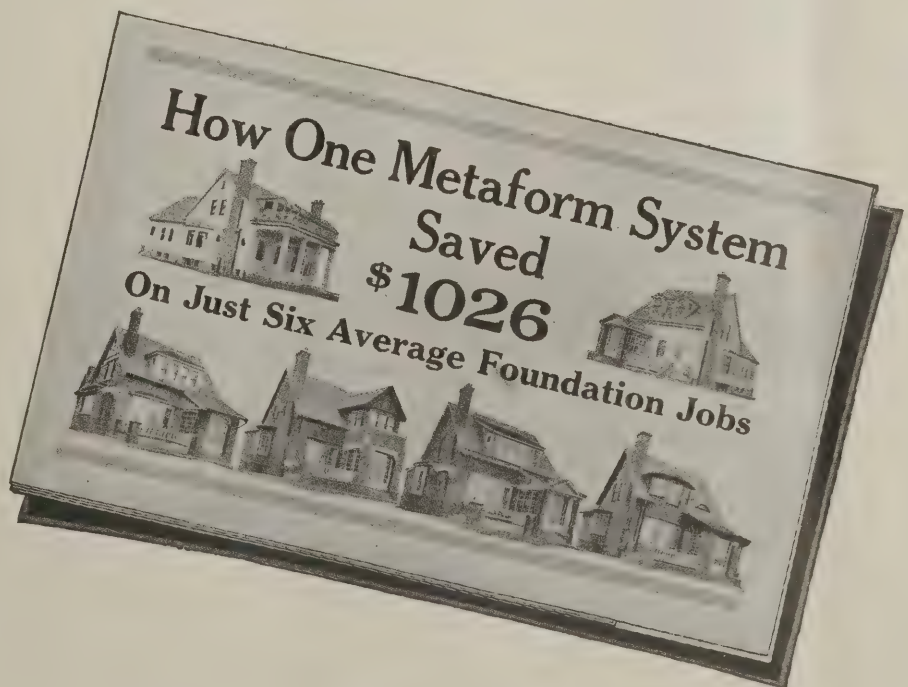
A Metaform System of adjustable metal forms for building concrete forms will stop the waste of lumber and labor. You can pour it faster and pour it better. And it will add to your profits on all concrete jobs, large or small.

Metaforms for All Jobs—Not One Job

Whenever you face the problem of erecting forms for monolithic concrete, a Metaform System will enable you to do the work faster, better and cheaper. One ordinary laborer can erect more square feet of forms by the Metaform System than five or six skilled carpenters can build out of wood. Your Metaforms will be useful on job after job, while lumber for forms is a constant heavy expense.

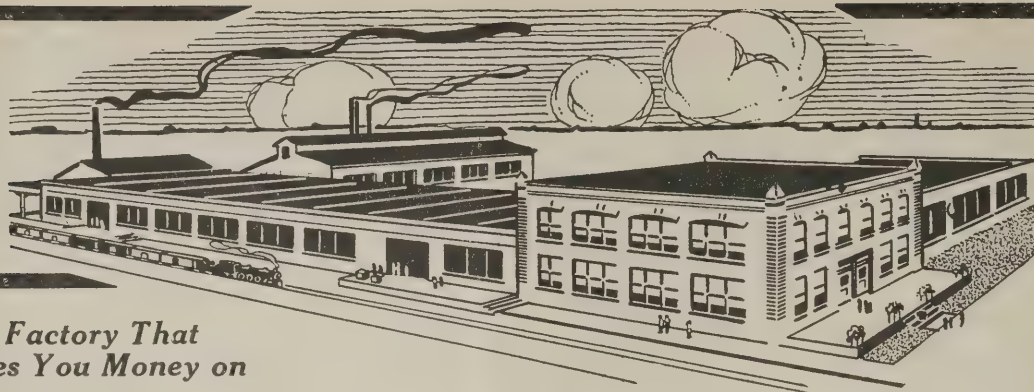
Folder Proves What Metaforms Did on Six Small Jobs

One thousand and twenty-six dollars saved by a Metaform System on six ordinary residence foundations—put right into the contractor's pocket. Is that worth while? Send for the folder that tells how it was done. Whatever you build in concrete—tanks, chimneys, silos, foundations, walls, pillars—square work or round work, straight or tapered—Metaforms will make money for you.



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*The Factory That
Saves You Money on*

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**Sold from manufacturer direct to users at
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Tile Machines



No. 1 (illustrated) makes all size tile from 3 to 12 inches diameter; capacity 1,500 to 2,000 tile daily; operated with 1, 2 or 3 men. Double-service packer head, all mechanism in base; no angle iron frame; no top-heavy design; waist-high table.

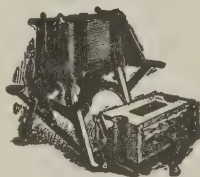
Concrete Mixers

Several sizes, with or without engine; on skids or trucks; extra large drum; all steel and iron construction. Heavy, sturdy, guaranteed.



Block Machine

Makes three styles of blocks—face-down, side-face, two piece hollow wall—all in many sizes. Off bearing system prevents damage to block. Capacity 150 blocks daily. Exceptionally strong, easily operated.



Vase Molds

Concrete vases sell readily for lawn or porch use. With Dunn Molds a vase can be made to sell at 200% profit. Every contractor should have one or two. Made in two sizes.



Sewer Pipe Molds



A wet mixture is poured directly into Dunn Molds and left to set; no tamping necessary. This method makes strongest pipe on the market; far better than a tamped product. All sizes, from 6 to 36 inches diameter.

Brick Machine



Uses the wet process—makes 10 bricks at each operation. Capacity 1,500 to 3,000 brick per day. Brick can be made either face down or face up; all perfect; none crack, because they cure on the pallet just as they are made. It will pay you to investigate this machine.

Porch Molds



Outfit of molds will make complete porch as shown, and blocks for other purposes. Concrete porches sell readily to owners of concrete, brick and frame houses. Cost little to build; sell at good profits.

Chimney Molds

Makes Posts, Piers, Chimneys, etc. All sizes from 8x8 to 24x24 inches; all 8 inches high. Four styles—Rock Face, Bevel, Panel, Plain. Special prices on outfits consisting of several sizes. Also made 4 inches high.



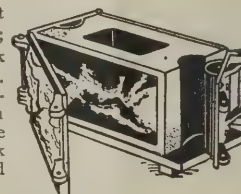
Fence Post Molds

Make the strongest, densest concrete fence posts ever produced, and at a lower manufacturing cost than ever before. A special vibratory base does all the tamping. Made in batteries of four and ten molds.



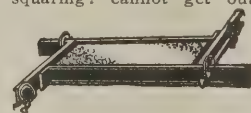
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Uses a wet mixture; makes block making easy. Makes rock-face or smooth blocks; made in 3 sizes—8x16, 10x20 and 12x24.



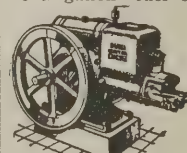
Cap, Sill, Step Mold

Does a great variety of work; adjustable to all widths from 2 to 24 inches, and to all lengths from 2 to 72 inches. Self-squaring! cannot get out of alignment. Made of heavy steel; cannot warp. Made 4, 6 and 8 inches high.



Dunn Heavy Oil Engine

No electrical ignition, no carburetor, no pre-heating. Burns fuel costing from 4c to 6c a gallon—fuel oil, solar oil, kerosene, crude oil, residuums, etc. No batteries, no spark plugs, no magneto. The reliability of steam power at one-tenth its cost. Write for Bulletin A2.



Write me your requirements and get our lowest prices; big savings and absolute satisfaction positively guaranteed. New catalog ready shortly—write for copy. Remember—we are headquarters for all kinds of concrete machinery, and sell direct from factory to you.

W. E. DUNN MFG. CO.
418 24th Street, HOLLAND, MICHIGAN

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Flex-a-Tile

House Tops

*America's
Standard*

Not Common Roofing — Uncommon Flex-A-Tile

Quality as Distinctive as the Name

Thousands of satisfied owners and contractors are praising the Flex-a-Tile Roll Shingle Roofing. This Roll Shingle way of roofing has the superior waterproofing, fire-resisting qualities of all Flex-a-Tile Housetops, but is quicker, simpler and cheaper to use.

Artistic Effect Flex-a-Tile Roll Shingle Roofing is so made by our Patented Process that each 5"x10" shingle butt is actually raised until it can be felt, thus giving the real, artistic effect of a shingled roof.

It Rolls On Over old roofs where removing the old shingles would be a dirty, bothersome, costly job; over new roofs right on to the sheathing. Any mechanic can put this on with perfect success.

It Lasts When ordinary roofs are wrecks under the stress of extreme weather conditions Flex-a-Tile stands up with sturdy dependability during the hottest or the coldest weather — through driving rain, sleet and snow. It will last for years with its original protective qualities and strength practically intact.

See What It Saves! It is very reasonable in First Cost and it effects a great saving on Labor because it is the quickest and simplest to apply; on Insurance because it belongs in Class "C" as approved by the Fire Underwriters' Laboratories. Upon request samples and full information will be sent. Write us about your roofing problems. Ask us for Bulletins 1511 and A23.



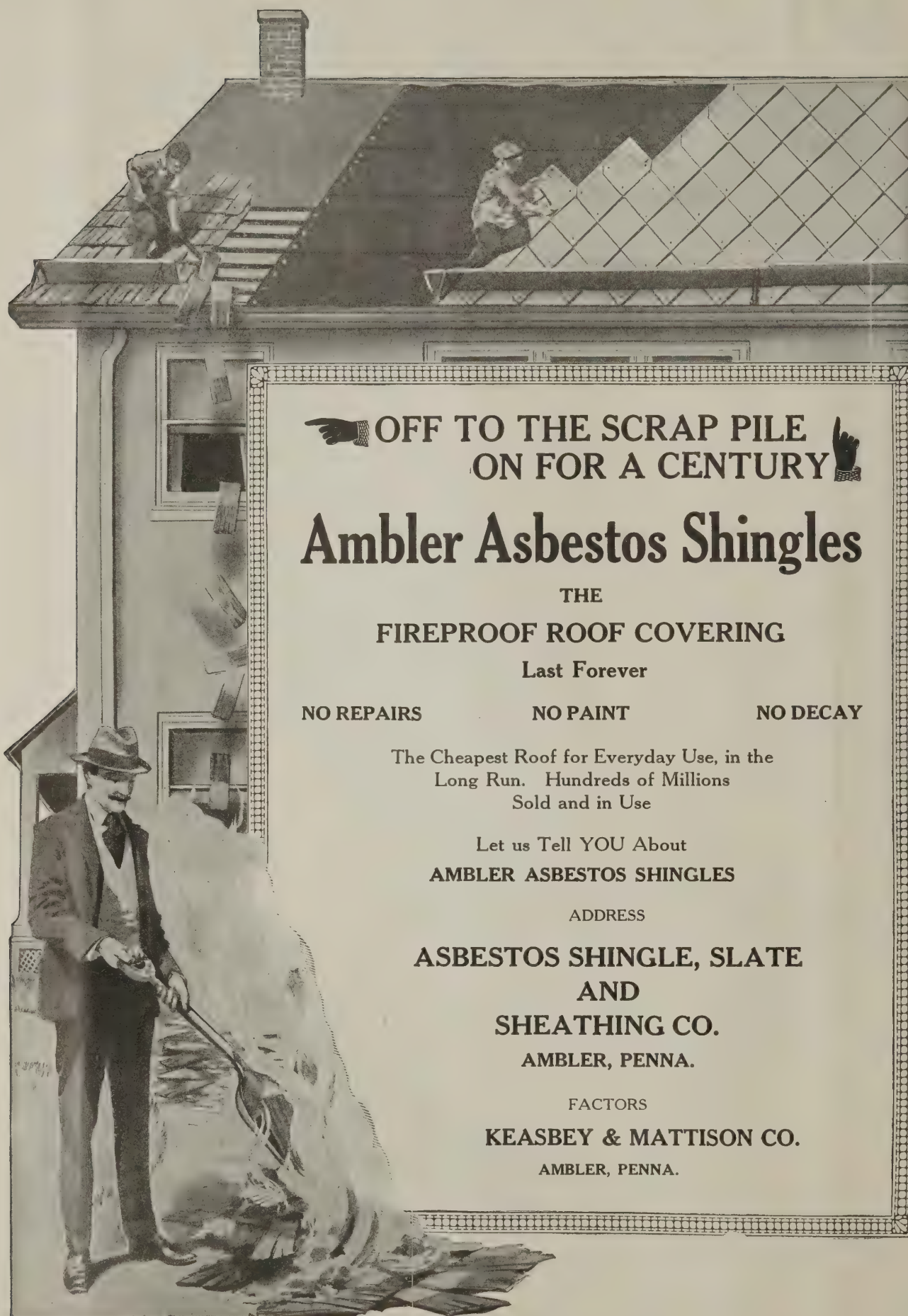
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ON FOR A CENTURY**

Ambler Asbestos Shingles

THE
FIREPROOF ROOF COVERING
Last Forever

NO REPAIRS NO PAINT NO DECAY

The Cheapest Roof for Everyday Use, in the
Long Run. Hundreds of Millions
Sold and in Use

Let us Tell YOU About
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The World's Largest Apartment Building



Paterno Apartments

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This building is said to be the largest Apartment Building in the world.

An evidence of its size is the fact that seventy thousand square yards of Berger's Expanded Metal Lath were used in the Ceilings alone. This is an area equal to nearly fourteen and a half acres.

Fourteen Acres of Ceilings

Modern City conditions—Heavy trucks and heavily loaded trains on the surface and in subways—produce constant vibrations that add greatly to the menace of plaster ceilings on ordinary lath. However, ceilings are safe

On Berger's Expanded Metal Lath

This material prevents ceilings from cracking and falling. It also makes the ceiling truly fire-retardant.

This applies as well to sidewalls and to the plaster or stucco of the smallest cottage.

Our Metal Lath Handbook F-47 contains much interesting information. Ask our nearest office for it.

THE BERGER MFG. CO., Canton, Ohio

Branches: Boston New York Philadelphia Chicago St. Louis
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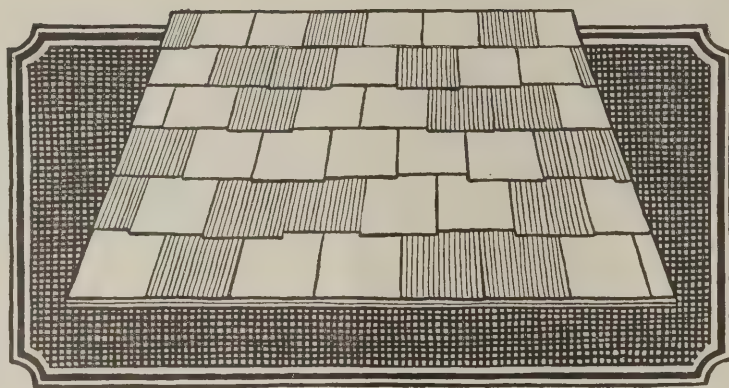
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BERGER

**EXPANDED METAL LATH-FLOOR CORES-REINFORCING PLATES-METAL LUMBER
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STEEL CEILINGS-ROOFING-SIDING AND OTHER PRESSED STEEL PRODUCTS**



You don't have to hesitate;
there's a place for each nail



AND there are three methods of laying Johns-Manville Transite Asbestos Shingles—straight, hexagonal and diagonal. You can't lay them wrong. You simply tack nails through the side holes in each shingle, and place the copper storm nail as shown in directions.

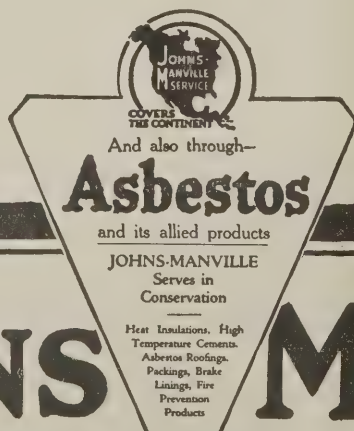
—not only that
but they're easier to lay

Johns-Manville Transite Asbestos Shingles make beautiful, fire-proof, time-defying roofs. Ask us to send you our booklet which describes these popular shingles, and explains the simple method of laying them.

This booklet costs you nothing, but it's worth something to have.

H. W. JOHNS-MANVILLE CO.
New York City

10 Factories — Branches in 63 Large Cities



JOHNS MANVILLE
Transite Asbestos Shingles

NATIONAL BUILDER

Volume 62

Chicago, June, 1919

Number 6

Supply and Demand Will Now Rule

BUILDERS and others have been waiting for something to happen to reduce costs. The urgent calls to "Build Now" have of course been heard—but the application of the advice has been passed as addressed to someone else. The builder is quite willing to "Build Now" if some one wants to build and has the money to pay him. So the builder waits—but all builders do not wait. Some who have the money or the credit see their opportunity, and are "Building Now."

It has been hard to realize the change that has been brought about in a few years. We are not all economists — financially weatherwise. Most of us are quite content to know enough to come in when it rains. So when the noted economist, Professor Fisher, told us that prices could not drop, we listened respectfully but decided to wait and see if they would not at least "wobble a bit." We were encouraged in this because Secretary Redfield had a plan to help us. Uncle Sam was going to get all the basic material makers to sit about the table and bring things to a show-down for the benefit of the country. Then we would know that the dollar's worth of building material we bought today would be a dollar's worth today and perhaps more than a dollar's worth next year—or not any less anyway.

When we went into the war we needed so many things and so much of many things that the boss—Uncle Sam—had to make a quick decision how to get these things in big quantities. He did just as you would do—when you want anyone to do anything for you quickly and well—he made it worth while. He promised the farmers a big price for their wheat, and he gave big pay and encouraged or insisted on others

giving big pay to nearly all sorts of labor. The last, indeed, was necessary because of the first—to more or less extent. Some places it was too much, some not enough.

Building was stopped. Iron and steel manufacture was hurried up and wages were increased so as to keep things going. War was everything—price was nothing, comparatively.

The railroads were taken over by Uncle Sam and freight rates were raised. Naturally these changes made everything cost more.

Prices Will Tend to
Go Up—Not Down
See Next Pages

Let us return now to that conference that Secretary Redfield had fixed up. The representatives of the various industries met in due time in conference with Secretary Redfield's Industrial Board and after all the stories were told and the condition of the country considered, the cost of producing, the wages that had to be paid, taxes, etc., a standard of prices was being arrived at as fair to all concerned.

But the railroad administration did not see it that way and refused to accept the Industrial Board's agreements. As the expectation of manufacturing in quantities was the basis of the agreement of the industries with the Industrial Board, the stand of the railroad administration made the work of the Board useless. Consequently the industries are released from all the obligations they assumed and all price negotiations are off.

The chairman of the Industrial

Board, George N. Peek, now authorizes the following:

The resignation of the Industrial Board having been accepted by the Secretary of Commerce for reasons now generally understood, making it impossible to proceed with its efforts to stabilize business, Mr. Peek states he deems it but fair and proper to announce that all of those industries that have submitted themselves to the Board upon the latter's invitation are no longer under any obligation to the Board, and are hereby released. These industries include those that produce materials used in the construction of buildings and other structures: steel, sand, gravel, crushed stone, cement, brick, plaster, lumber, glass and boxboard. Some of these have submitted proposed prices which have been under consideration by the Board, and, in the case of steel, prices that were considered by the Board as fair and reasonable have already been announced.

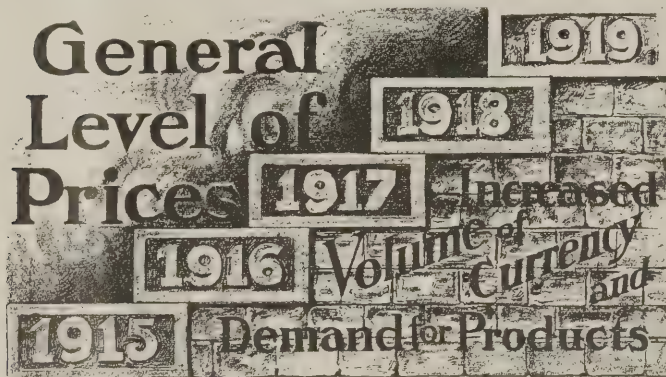
In conducting its investigations the Board found that very much higher costs of production, resulting from conditions brought about by the war, precluded the possibility of immediately making as large reductions as were thought possible without disturbing labor rates. Labor rates have increased from 85 per cent to as high as 140 per cent in the steel industry, and labor costs in even greater ratio, and as labor either directly or indirectly constitutes approximately 85 per cent of the total cost in many industries, it will be seen that as compared with pre-war levels, prices must necessarily be very much higher than formerly, unless a general liquidation of all values are effected, which is considered impracticable at this time, or so long as the high cost of the necessities of life prevails.

THE BUILDER

By Allen

The Builder Must Know Why Prices are High Wishes to Convince his Customers

BUILDERS should be in a position to prove to their customers that they need wait no longer. All the investigating has been done that can be done, and we are down to the solid fact that materials are short and the demand is immense.



To get up **HERE**— took five years
it will take much longer than that to go back—
if we ever go back

Builders cannot start things by themselves, as a rule. Those who can—the biggest ones—are going ahead as fast as they can secure the capital, in what ordinarily would be called speculative building—but a sure thing under present and future conditions.

Generally speaking, the builders themselves are not fully convinced of the wisdom of the urge to "Build Now," and consequently make a poor job of convincing their clients—prospective home owners—that there will be no time so good as the present to get that building under way.

It is significant, however, that many builders are building for themselves—which shows that these men are believers and not doubters. They are "bulls" in the

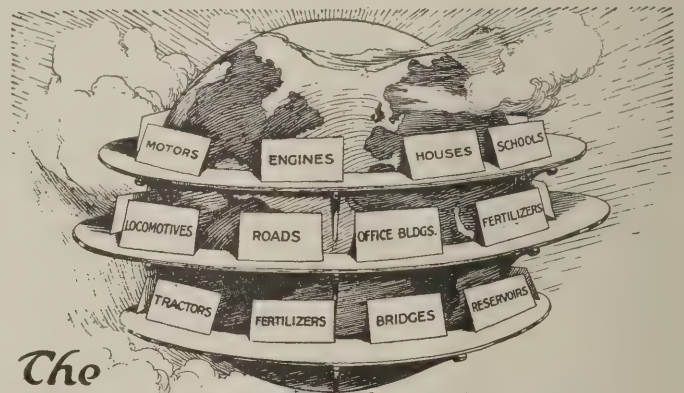


Which is the Worse "Profiteer"

market. Those who have purchased lots and own their own homes, are putting up two and four family apartment buildings, and getting ready to move into one of the apartments and rent their present homes, sometimes remodeling these into two apartment or duplex dwellings. These men are practical boosters—"bulls" on the United States.

They give an object lesson to their customers by taking their own medicine.

You cannot lose if you are a "bull" on the United States. That is one of J. Pierpont Morgan's maxims, and it never failed him.



The Shelves of the World Are Bare

There is no business closer to the verge of unprecedented prosperity than is the building industry today. In fact one foot is already over the line and almost every other business hasn't even started. The causes are at least interesting to follow.

The United States is the world's creditor nation. This means one thing: Industrial Expansion. Before any other business can get fairly started it must have an office and a factory. Almost at the same time it must have adequate railroad facilities. What good is plenty of ships if factories are unable to manufacture goods enough to fill them? The railroads have not been developed during war time to take care of this tremendous world trade so the next important thing is to have enough warehouses to stock the goods awaiting shipment. Changing about of labor has made housing scarce. More houses mean better schools, more churches, bigger institutional buildings. More houses mean more roads and more roads mean the ultimate erection of houses on the land development plan.

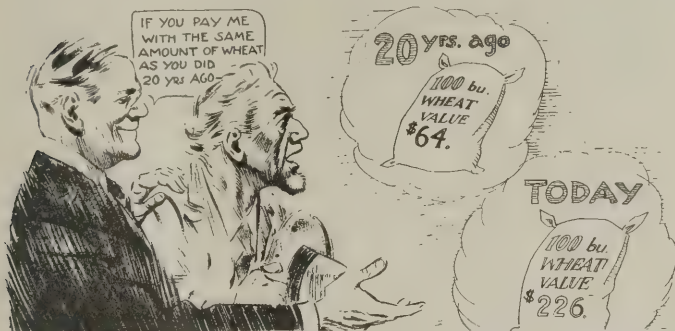
What does it mean to be a "Creditor Nation." The

AS A BOOSTER

E. Beals

and Why Prices are Likely to Advance if he that it is Wise to "Build Now"

simplest explanation is that more than half the money we have spent for the war will be returned to us in the form of investment funds. This money will go into industrial securities, railroads and municipal and



AN ACTUAL INCIDENT WITH A BIG MORAL

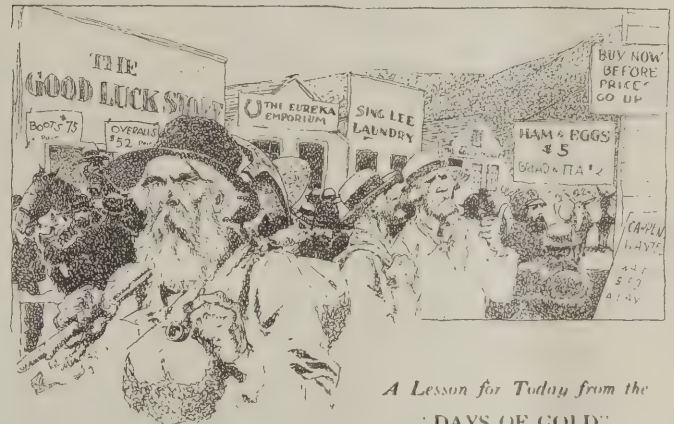
national bonds. Wherever it goes its chief use will be diverted to construction of one sort or another at first. It will be used to purchase new machinery. New machinery means larger factories. Larger factories mean more hands to operate the machines and handle the finished products and those employees must be housed, not in any sort of a shanty, but in a better house than they had before the war because they can afford better homes.

Every new house that goes up represents a certain sum spent for finishings. That means that the cabinet maker and the furniture man will have to enlarge his plant and the wielder of the hammer and the saw and the chisel will find all he can do both inside and outside in building the factory, the office building, the store and the furniture itself. So it is in every industry, even that of agriculture.



*We spent royally for Defense
Let us now spend wisely for Construction*

We forget what it means to have an under-built nation of more than a hundred million people. We cannot conceive the fact that for every hundred homes that stand at least one more has to be built before the country's construction program can attain even a normal condition. In peace time, for instance, marriage alone calls for more than 100,000 new homes a year and for almost two years two million men have been too busy with Uncle Sam's affairs to do much more than *think* about getting married. In prosperous times the country erects almost half a million structures a year, but in

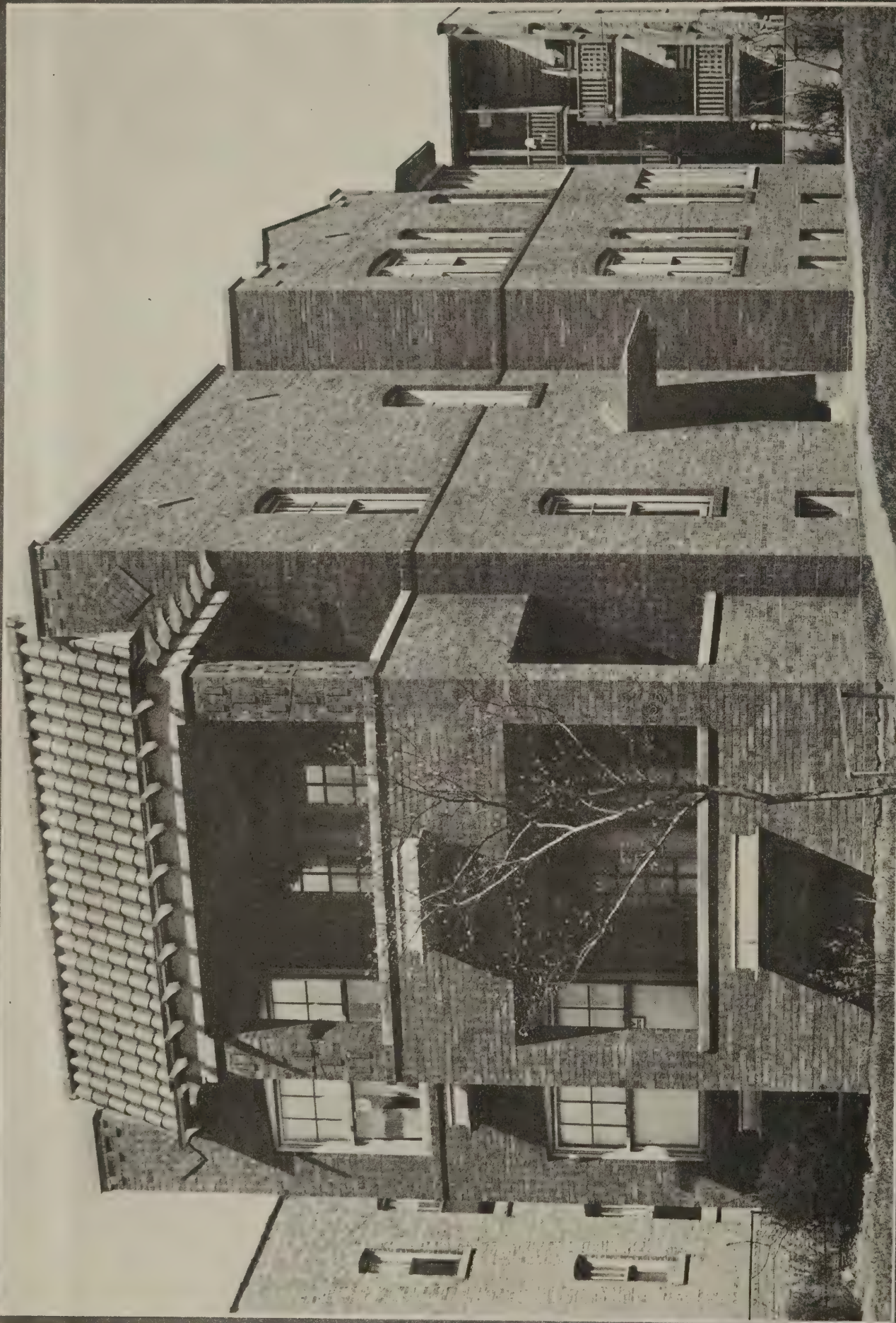


*A Lesson for Today from the
"DAYS OF GOLD"*

the last two years, this volume of actual building outside of Government needs has been shrunk to almost nothing yet people in that time had not given up hope of building. Therefore all that construction will soon or later proceed to actuality because the American people have the money either in the banks or in Liberty bonds. The American people are richer today than they ever have been and the degree of a man's success is often counted by the fact of whether or not he "owns his own home."

In all your experience have you ever known a time when the subject of housing is as acute as it is at present? It is a subject of every day discussion everywhere. When there is a known demand for a thing can you recall a time when it was not supplied? What more essential thing is there than shelter? What better financial investment is there than the improvement with a building of a part of the land that Uncle Sam's boys, some of your sons themselves, maybe, went out to protect against a hostile horde?

The whole country looks upon the builder as the peace time soldier, the Marine of Industry because he is the first to show the way—and he's started.



A Two-Story Apartment Building—Full Working Plans in Supplement to This Issue

Chas. E. White, Jr., Architect

Why Not Build a Two-Flat?

By Chas. E. White, Jr., Architect

IN these strenuous times of under-housing when tenants are falling all over themselves to find quarters suitable for themselves—when there are not enough homes to go 'round and people who have been paying rent for years and years and have nothing to show for it but a bunch of receipts and pleasant memories are kicking themselves because they didn't build long ago—many newly awakened wage earners are wise to the possibilities of a two-flat building, both as a home and as an investment.

Snap up a piece of property somewhere, just a little beyond the outskirts of a good residence district where you will be, in a way, pioneering. If you purchase property in a thickly settled district it may cost too much, but if you get in a little ahead of the crowd you will benefit by a lower price, and later, reap the reward of a rising market.

Any contractor who does not own his home is, of course, following out a most inconsistent policy and one that may cause remarks among the business men he comes in contact with. You would think it strange if a dealer in automobiles had no car of his own, wouldn't you? If your clothier dressed in sloppy clothes or your haberdasher wore frayed collars and ties you would think him inconsistent, wouldn't you? For the same reason the world looks at a contractor's place of residence and sizes him up according to the air he maintains around his own home. A neat, thrifty looking place indicates a thrifty contractor.

At not a great advance over the cost of a brick private house you can build a brick flat building and thus make of your home an investment. You can fit one of the flats up for your family, just as you want it, and the rent you receive from the other flat will more than pay your own rent—for don't forget, you are really paying rent even when you own your home, in repairs, interest and taxes.

If you build your flat building along new and original lines, and make it "different" from other buildings in the neighborhood, you will have the cream of the tenants at the highest possible price. In fact, tenants will move out of other, less attractive buildings and go into yours, and you will have a waiting list of eager tenants who desire to live in your building.

The little flat building illustrated is built of "Tapestry" brick, which comes in many pretty shades of browns and

reds. The living room is generously large and opens into a veranda which is really a sun room. The building looks unusual and one would almost imagine upon viewing it that the owner lives on the premises, so "private" a look it has.

Any little building like this is bound to be a good investment for a contractor and he can have, besides, the satisfaction of living in his own home with the knowledge that what he has done in erecting such a building will detract nothing from his reputation—and what is more vital to a contractor than reputation?

A complete set of working plans of this building is given in the Supplement (No. 466) in this issue. Note when comparing the plans with the photograph on the preceding page that the plans are reversed for reasons stated in the article.

The building illustrated, which is built on a lot 35 feet wide, has an entrance on the side instead of in front. In this way it is unlike the ordinary flat building. The chief reason for having the main entrance on the side is because it permits the front porches to be more private than would be the case if the front steps led up to these porches, and the front entrance opened therefrom.

Screening in porches like these provides a complete little airy room for each apartment. They are very popular, and deservedly so. It even pays, in some instances where the increased rent offsets the additional cost, to glaze these porches for winter use. Thus they become sun rooms. Radiators may be added if the tenants will pay for these luxuries.

As will be noticed upon referring to the plan and comparing it with the photograph, the former is "reversed." That is, the building was actually built with the entrance on the right instead of on the left. As a matter of fact, five of these buildings were built in a row, some with entrances on the right, and others with entrances on the left.

In examining the plan, please note that the living room is unusually large and has a fireplace with a genuine flue. By building the fireplace against a brick wall in this fashion the additional cost of a flue is very little; then your tenants can burn gas, wood or coal in their grates.

Opening the front porches from a bedroom as well as the living room pleases your tenants because they can then use the front bedroom as a library if they wish, and it is nice to have the glass door with the porch beyond. Also, frequently, the porch can be used as a sleeping porch, opening as it does from the front bedroom.

With a side entrance like this plan it is usually better to have the doorway up just one step from the ground, and four steps below the main floor; thus you can walk up one step into the vestibule and then four more steps inside the vestibule to the main floor. In this way all the steps are enclosed in the vestibule and not outdoors where they would be hard to keep free from snow and ice in winter time.

To gain access to the basement it is economical to have the basement stairs right under the main stairs as shown on this plan. In some flat buildings, however, the front stairs do not go to the basement and access to the latter is provided by the rear stairs only.

In glancing at the walls of the building as shown on the plan, you will see that the living room wall has no windows, and stands right on the property line. The living room gets its light from the two front windows and the single window at the rear. Of course, considerable light also comes from the glass door on the porch.

The rear wing of the building containing a bedroom, dining room, kitchen and bathroom sets back about 4 feet from the property line on one side in order to permit windows in the bathroom and kitchen. If the owner of the lot adjoining built right up to the living room wall, of course, this 4-foot offset in the wall would be merely a light court, but it should prove sufficient.

The Two-Apartment House

THE two-apartment house is quite popular in the smaller cities. It offers many of the advantages of the larger apartment buildings and when located in a good neighborhood is often preferred by tenants.

In many of the houses of this type the owner occupies one apartment and rents the other, thus deriving considerable income from his home and yet sacrificing very little privacy. Many middle aged

and it must be remembered that houses lacking in lawn space at the side and front do not attract desirable tenants. The modern back yard is usually taken up with garages, vegetables gardens, and space for drying clothes so that the sides and front are the only places left for the lawn and flower beds which add so much to the attractiveness of a dwelling.

This type of plan should not be likened to the semi-detached type. The

ter calculated to ruin a good disposition than to be compelled to listen to the clatter of heels and the scraping of furniture on the floor above one's head—tenants won't stand it, they move as soon as the lease expires and every move costs an owner money. Even if the apartment is immediately rented again, the new tenant will usually exact his "pound of flesh" in the way of re-decorating, repairing and small changes



This house has the living porch at the side. Such a carefully designed exterior is worthy of study



Here is simplicity itself. The flat roof of the porch is covered with tin, and the sash may be removed in summer



If the lines of a building are good, a few well placed brick panels will often be all that is necessary for decoration



The cornices, etc., are of wood. It is a clever piece of workmanship, but terra cotta is more suitable here

couples whose children have set up homes of their own, adopt this method of building a home. They thereby relieve their loneliness and also derive a fair income from an easily managed business.

The accompanying plan illustrates a very compact arrangement for a house of this character. It is adapted to a 50-foot lot, but could be squeezed into a 35-foot space, providing the neighboring houses are not set close to the property line. Such crowding is not justified in towns where land is relatively cheap,

latter kind may be likened to two separate houses placed side by side with a wall in common between them, each house having the sleeping portions on the second floor and the rest of the rooms on the first floor. In the two-apartment house, however, one house is set on top of the other, with all of the rooms which belong to it on the same floor.

Some sort of sound-deadening treatment such as those described in the April NATIONAL BUILDER should be used for the second floor. There is nothing bet-

here and there to suit his taste and requirements.

Builders should always point out to a client the desirability of these features of construction, even on a small job. If the client doesn't approve of your suggestions, you are at least safe from the everlasting query, "Why didn't you tell me?" after the house is built.

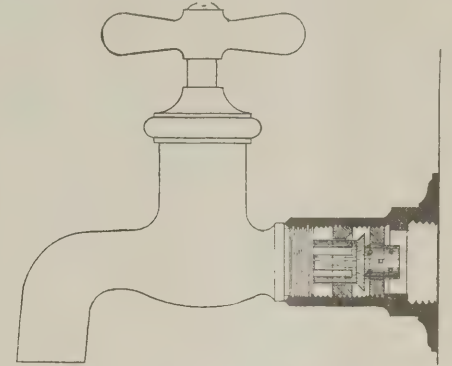
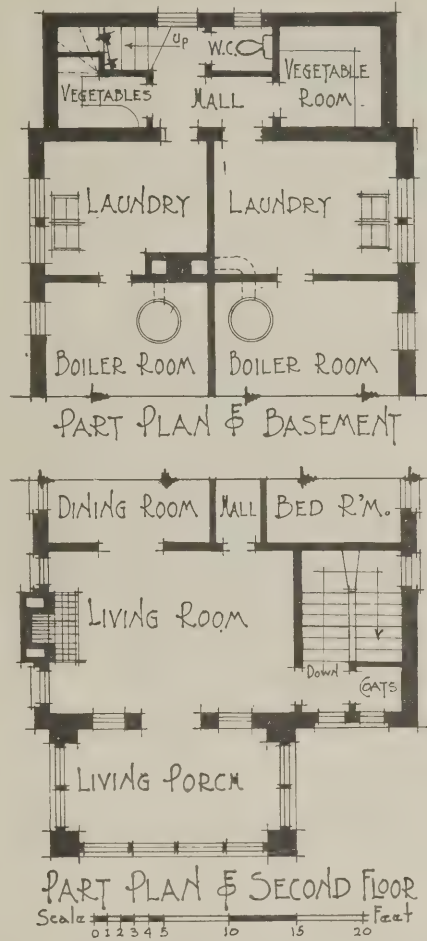
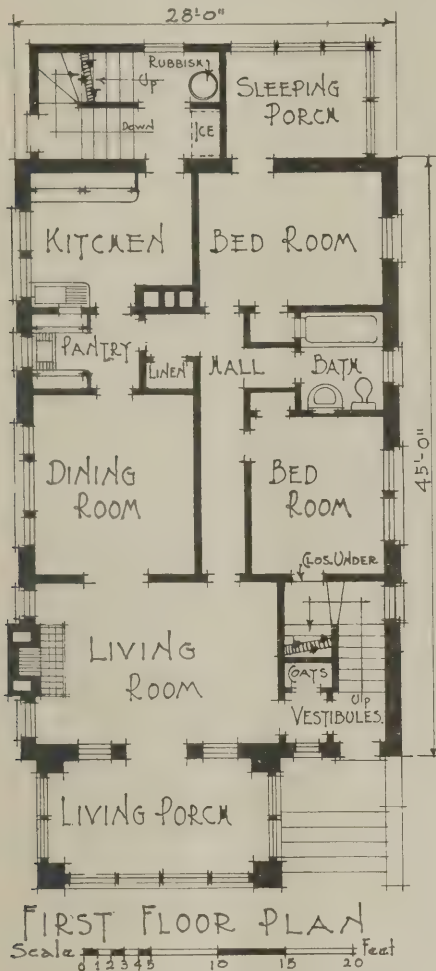
The plan that is illustrated by no means exhausts the possibilities of arranging the different rooms, it is merely representative of a convenient plan adapted to the needs of the average

man's family. It would be difficult to plan a livable five-room house that would require less space than is used here, but many variations might be employed. Your favorite bungalow plan is

light are the important practical features to be considered in any plan designed for dwelling purposes.

The elevations may, of course, be of many types. Brick, stucco, or wood are

tration shows the valve open and the faucet on. When the faucet is screwed on, the thread strikes the front of the slotted end of the valve, forcing it gradually out of seat, the water flowing through the holes in the rear chamber, around the valve and through the slots in the front chamber into the faucet. It is claimed that the pressure or flow of water is not lessened. Two collars are



used with this valve, the front collar having the seat and straight bore or bearing which guides the slotted ends, while the rear collar has a plain bore. Both collars have an outside thread which admits of quick adjustment in the joint and the valve has an easy sliding motion. When the faucet is removed, the valve closes, and while the faucet is being unscrewed, the pressure of the water forces the valve forward, so that it is in seat and the water entirely shut off before the faucet is entirely removed.

likely full of suggestions that may be the materials usually employed in the applied to the development of a plan to construction of the exterior walls. Here, as in any other building the treatment is largely a matter of individual taste.

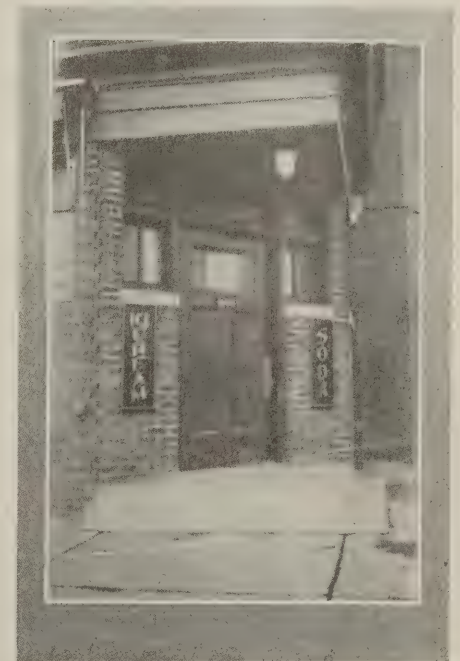
Don't forget the desirability of plenty of closet space. The smaller the rooms the more closets are required. The hall should not be entirely dependent on artificial light. In the plan illustrated the doors from the pantry and the bath room should be glazed with opaque (frosted) glass to light the hall. Further description of the plans are unnecessary. Compactness, convenience and

Just because a house must be inexpensive is no reason to perpetrate an eyesore on the helpless public. The most competent designers are those who rely on mass and proportion to overcome any lack of funds. Cheap gew gaws often distract our reasoning powers to such an extent that we forget what really makes the permanently attractive features of a building.

A New Water-Check Valve

Knowledge of the "trouble-preventers" and conveniences that are coming into the market almost daily give the builder a reputation for being up-to-date, and that reputation means that work will seek him. Few householders are without the experience of putting in a worn-out fuller ball in a tap and having the entire household deprived of the use of the water-system while the job was being done. Kitchens and bathrooms and

living rooms have been flooded when accidents have happened to the taps. The illustration shows a device which automatically checks the water flow when a tap is removed. It has no springs or complicated parts and is an idea developed after twenty years' experience in the plumbing field. Its use requires no new or special fixtures and can be readily adjusted to any water supply and to tanks of every description. The illus-



DRYING OFF THE WET PLACES

Builders will have an opportunity to exercise their ingenuity in converting saloons to other purposes. This one has "bar" on the door with "ice cream and soda on the side."

ON THE JOB

By William Robinson Safford

THREE men stood on a fine asphalt-paved, three-arched street in a swell residence district, talking. Each was a representative man in his line—well dressed, alert, prosperous. Each had his automobile nearby and you could tell by the vigor of their conversation and their quick, energetic gestures that each was a live business man with a clear perception of what he was talking about. One was an architect, another a mill man and the third a contractor.

it is, you have to beg them to figure, plead with them to send the plans back and urge them to send in their bids, and then they say 'you haven't had any work for two years, give us a job'—but they don't deserve a job, some of them."

ing a bid or following up a bid already made to see why we don't get the job."

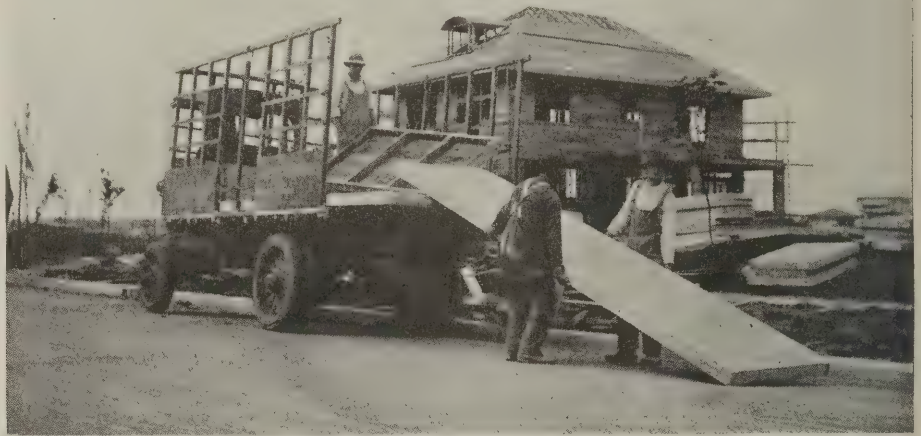
"That's the stuff," agreed the architect. "No matter how much work you have today if you don't prepare for tomorrow's job, when tomorrow comes



In the contractor's storage yard everything should be as carefully and accurately piled as in a lumber yard, where every separate article can be quickly taken "out of stock" when wanted. Train your men to put tools away, automatically, in the place provided for them.

Said the architect, "The trouble with some contractors is that they are never 'on the job.' We have a job to take bids on and my office calls up a dozen contractors to come and get the plans and specifications. Some come promptly but many drift in after wasting three or four days. Then they keep the plans a long time and return them only after repeated requests from the office."

"And they don't send their bids in even then," said the mill man. "I know how



For the contractor who specializes in concrete foundations there are sectional forms, to eliminate that waste which always occurs when new forms are built for each job. Some of these forms are made of plank and others of metal; the latter are ingeniously designed to produce every required variation of height, shape and thickness in a wall.

The contractor smiled, "I always give preference to bidding," said he. "Never a day goes by that we don't give a push toward getting a new job, either by mak-

you will be out of work. Contractors make a much better hit with architects," he went on, "when they get plans promptly and return them quickly with



No piece of machinery is more thoroughly on the job than a good concrete mixer. The old, hand-mix method is no longer tolerated, either by the owner who wants a good job, or by the contractor who wants to save time. Measure your materials when mixing. Don't guess.

their bids. With a good many bids to get on every job the architect is up against it if he can't get bids promptly and have one contractor release plans quickly so they can be handed to other contractors for bids."

Then those three men who had worked together time and again and understood and appreciated each other thoroughly began to compare notes. They took the names of four carpenter contractors, well known first class men and discussed their characteristics.

Hammond was a fine man, they agreed. He had made money and his word was highly respected in the community, but the last year or two he seemed to be losing his hold. Why? Because he is inefficient; as honest as the day is long but you have to chase him up all the time to get anything done.

Gersing is forging ahead every day. He seems to be getting more jobs than Hammond. Why? He is always **on the job**. If you ask him to make a bid on a job, he calls today and gives his bid tomorrow. Sometimes he is high and sometimes low, but in any event you get his bid promptly and if he gets the job, you know he will run it efficiently.

Anderson is a thrifty Swede. On the jobs he wants he figures close and usually lands them. If he figures high you may know he doesn't want that job; at any rate, he is "quick on the trigger" and you don't have to wear your life out getting things done.

Pilgree is a grouchy old builder whose bark is worse than his bite but he keeps lots of jobs away because people don't understand him. One at a time is the only way he can handle work. He hasn't the capacity to run several jobs at once

but just ambles along with one piece of work after another; does each thoroughly but takes lots of time to do it.

"So there you are, gentlemen," said the architect. "I'll pay Gersing more money to do a job because it takes a

because he is asleep at the switch most of the time."

Now, friends, this isn't an imaginary conversation. The talk really occurred and I have been present at a great many similar talks. Efficiency counts in the



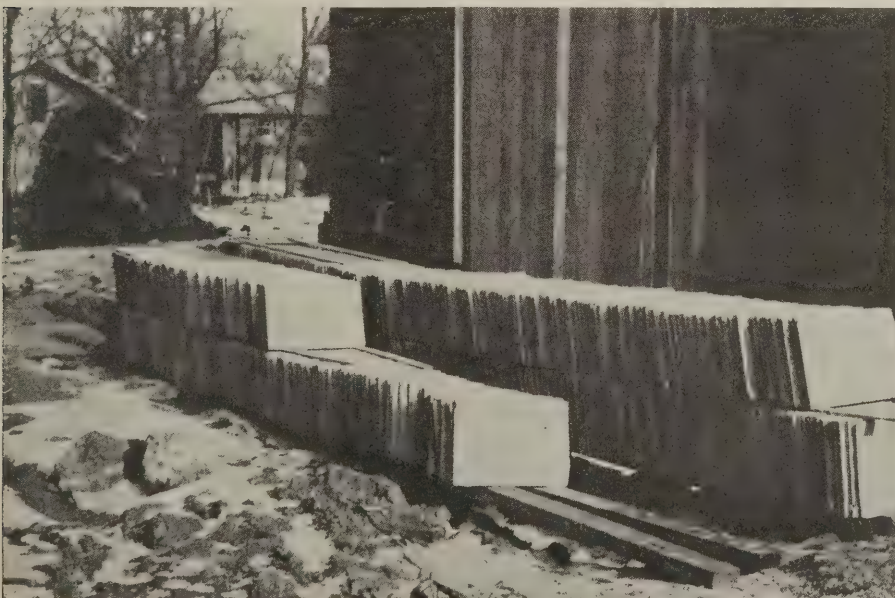
Here is a poorly piled shipment of slate and when the superintendent reaches the job there will be helltopay. It breaks the slate, loses time of the roofers and if a thaw comes and then freezes—look out.

load off my mind. If his bid is so high that it is way out of reason, of course, I can't give him the work but if he's anywhere near the right price he's pretty apt to land the job. I figure," he went on, "that it is worth more to the owner to get his work built more quickly than to deal with a lower bidder who lets the job drag out several weeks longer, just

contracting business just as much as in any other business. The man who is **on the job** is the man customers want to deal with in these strenuous times when all business men are living under an unusual strain. The man who builds a building and has the money to pay for it doesn't want to be worried to death during its construction nor does he want to plan to occupy it in October and finally find he can't get into it until January. Especially, when he knows that a live wire could very well get the job done in October.

So far as the owner is concerned it is a perfectly open and shut proposition. A first-class building such as his has been built before in three months. Very well, then he expects his building to be finished in three months. Delays caused by a busy season—the mill not getting out frames on time, too much rain, lack of laborers, no cars to ship steel in, brick tied up by strike—these difficulties mean nothing to the owner. The problem to him is—**give him his building, quickly**. If delayed on account of difficulties, **overcome the difficulties**. If you lose time on one item make it up on something else.

The first place where contractors often fall down is in **disciplining themselves**. They may have the elements of a good working machine in the personnel of their organization and the trouble is often with the contractor himself. He



—But this nice orderly stack of slate is piled right at the foot of the scaffold to which it can be hoisted with very little effort. These little things indicate whether the boss is on the job or not; if he doesn't care, the men don't. It is up to him to care.

tries to do too much with his own hands when it would be better for him to spend more time selecting and training helpers.

Just as soon as a contracting business is big enough to hire even one extra man, it is big enough to be efficiently organized. Then, right at the start, is the time for the builder to use his brains and map out his daily tasks in some kind of system.

He ought to get up at the same hour every day. His business routine should be as near the same each day as possible; such an amount of time for telephoning, so much for inspection of the work, so much for purchasing materials. Let him not forget that this is a maxim all successful contractors' practice—let no day pass without starting something for a new job. No matter how busy you may be now, some day, these jobs will be finished. Unless you plan for new work all the time there will be no new work for you when the old work is done.

Let your machine be geared for good work without friction. A good place to start efficiency is right in your storage yard. Do your men throw down their tools helter-skelter, hit or miss? Are shovels, picks, wheelbarrows, hods, trays, forms lying all around the property, or can you put your hand right on anything you want in an instant's time?

Your storage shed should be as orderly as a lumber yard in which each size and kind of stick is ready to find in its own pile.

Next, you might pay a little more attention to how material is piled at the job. Do your men dump off their loads where it is most convenient, or do they think a little about the other fellow who



Pile your material and mixing platform right beside the work and see how much faster the work will go. Laborers make lots of trouble for themselves, sometimes, but the boss should make things as easy as possible. His brains can make more dollars when he watches the little points of the game.

must pick up the goods again and build them into the building?

The time lost by high-priced mechanics hunting for materials, on account of lower priced laborers who piled them in a bad way, is often excessive. Take slate, for instance. I have been on jobs where slate was roughly thrown into piles causing a lot of breakage and losing the precious time of roofers. Slate should be stacked carefully on planks, set on edge always, so that cold storms will not cause slates to freeze together.

When a building is staked out ready to start the excavating is the time to



The man behind the guns is the laborer. He can help you to make or lose. Have plenty of him unless you want brick layers standing around waiting for mortar and brick. Temper the mortar and save the temper of the brick masons, to say nothing of the temper of the trowels.



Don't put up flimsy batter boards, to be knocked down by wagons or pushed over by small boys. Put in your stakes for keeps and you won't have any sad experiences with losing lines and levels. Batter boards are useful until the job is well above ground, and then some.

begin good management on that particular job. Use good, long, heavy stakes to nail the batter boards to, and place these batters far enough from the excavation so they will not be undermined in building. Many a contractor has caused himself trouble by setting batters carelessly, and losing his lines and levels later.

Contractors who specialize in concrete



One man at the pier of small stretch of wall, and the best men on the leads is what every good foreman believes in. Watch how your men are distributed on the work; it may mean the difference between profit and loss to you.

use a machine, of course. You might as well try to bake bread in an open fireplace as to mix concrete by hand; no



Labor saving devices have always been profitable to builders since the days the Pyramids were built; we can only guess how they raised those blocks on the walls but, today, we have derricks for the same purpose. No builder's equipment is complete without one or more; some are of wood and some of iron—a kind for every purpose.

accuracy in either method to say nothing of the time lost. To make your machine do its best work in a minimum of time bring the water right up to it by means of a hose; pile your sand and crushed stone along side where it is easy to get. That means, locate your concrete mixer where teams can haul material right up to it.

In mixing concrete measure everything—water, sand, cement and stone. Don't guess at anything, and you'll get the best results. A greenhorn, with a formula and the determination to measure all materials carefully can beat an old-time cement man who goes by "looks," a mile. The "taste and smell" rule works fine for doughnuts, but not for concrete.

Have you ever seen men mixing the top dressing for a sidewalk, about fifty feet from where it is wanted? The next time you see your men doing that tell them they will save themselves lots of labor if they will make the mix right alongside the sidewalk. That's one of your prerogatives as boss—to save steps

for your men and dollars for yourself. Your eye should be keen to note all these conditions every time you visit the job. That is being **on the job** and nobody benefits more from it than you.

Don't be skimpy with your laborers when you have a gang of brick masons at work. You'll never see a brick mason loafing; he's too wise for that, but many a good one is obliged to slow down waiting for a laborer to bring him some brick and mortar. Watch this point carefully; it's better to have a laborer slow down than a mason. Have too many laborers rather than too few.

Then, of course, you are all wise to the importance of putting your best men on the "lead." If you put a slow man at the corner he gets his courses up so slow that the men in the middle have to slow down to keep below him. Be sure and watch for the "one-man jobs," and don't allow two brick layers to putter along on a pier or short piece of wall when one could do the work almost as rapidly as two.

An Unfair Practice: A Protest

By Daniel J. Hauer

IT would be interesting to have a poll of the readers of NATIONAL BUILDER who have made up plans and estimates, or who have only submitted estimates for buildings to owners or architects and have had their figures hawked around amongst their competitors in an attempt to beat down their prices. No

that they must submit to such abuses, rather than fall out with architects and owners who can give them contracts. One contractor recently went through this experience, having been treated in a similar manner many times before, but he concluded it was time to protest, which he did in the following letter to the architect:

"We are prepared to give you a formal bid for the erection of the thirty-two garages, the large garage, the twenty-five houses.

"We take it for granted that you have or will appoint a day and hour when all the bids will be opened in the presence of the bidders, as this is the manner in which ninety-five per cent of all proposals are accepted.

"We are going to give you a low bid on the condition that the most responsible low bidder will receive the job.

"We have gone to an exceedingly great amount of expense and labor to compile our bids, in order to get them down to a low figure, and we trust our efforts are appreciated. We are prepared to meet all requirements of your contract and specifications and give you a satisfactory job."

In this case the builder had made up a rough estimate of the cost of these buildings on incomplete plans in order to assist the architects and owner to keep their designs within a reasonable cost. Later when the plans and specifications had been completed he had got-

WHATEVER elements of injustice have been accepted in the building trades should be brought to light and freely discussed. National Builder opens its columns to discussions of this character. The names of the contributors to these discussions should be given, but not necessarily for publication. The facts of each case should be recited as clearly and briefly as possible. That there is another side to Mr. Hauer's protest is shown in the fact that the size of the job makes a difference in the way bids are handled, and the preceding article, "On the Job," goes to show that jobs are let on personality as well as on price.

doubt a majority of its readers have been through such experiences many times.

Protest is seldom made of such practice by builders, for many of them feel

ten proposals from sub-contractors, prices from material men and had estimated an exact price on the structures. To keep these estimates low he had in many cases cut the proposals of the sub-contractors and material men. For instance on the twenty-five buildings he cut the painter's price of \$250 for each building to \$185, on the mill work he cut the price on the extra twenty-five buildings \$1,800 and so on throughout the list. With these prices revised he made a low estimate and submitted it to the architect. Meanwhile he got in touch with other sub-contractors and dealers so as to get prices to conform to those he had submitted. In doing this he did not hawk the prices he had received, but submitted schedules for them to name prices upon, thus eliminating indefinite quantities and grades that were not needed.

A visit to the architect resulted in being told that a builder had submitted a price much lower than his, only a little more than half of his, and the builder was asked if he was prepared to meet such a price.

The reply to this conversation by the builder was the writing of the letter as given.

He clearly shows his disapproval of the unfair methods adopted by the architects, yet he is polite and states he is willing to submit a new proposal, provided the architect will conduct a fair award and open the proposals in the presence of all bidders.

Such conditions and even worse ones in the building trade exist and the remedy to a great extent lies with the builders of the country, provided they would co-operate to stop them.

It is certainly unfair for an owner or an architect to use the proposal of one builder to get a cheaper price from another. It is wrong, too, to show a builder's bid to a competitor and ask him to meet the price. This means that the builder who has been fair to the owner by naming the lowest price is deprived of a job by another, who may have estimated as low or a lower price, yet named a higher one, thinking that no one else might bid lower, or counting upon his friendship with architect or owner to secure the job at the higher price. In other words, the one who may not have been sincere in his bidding is given the job for playing false.

Then, too, this practice of hawking a builder's prices from one to another is wrong. The proposal is made in good faith and for the owner, and it is wrong to give the benefit of it to competitors.

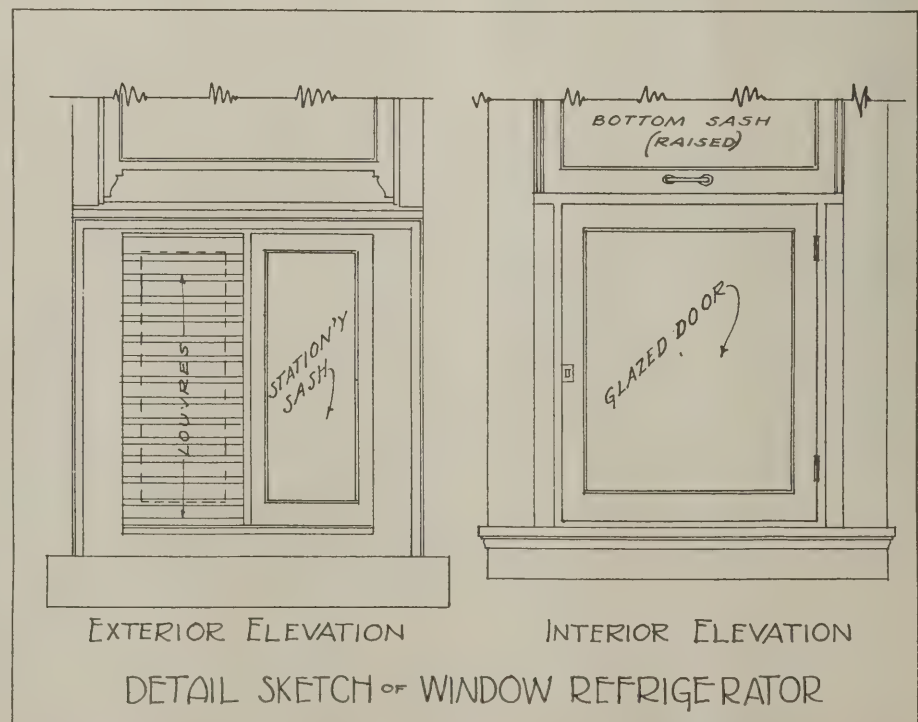
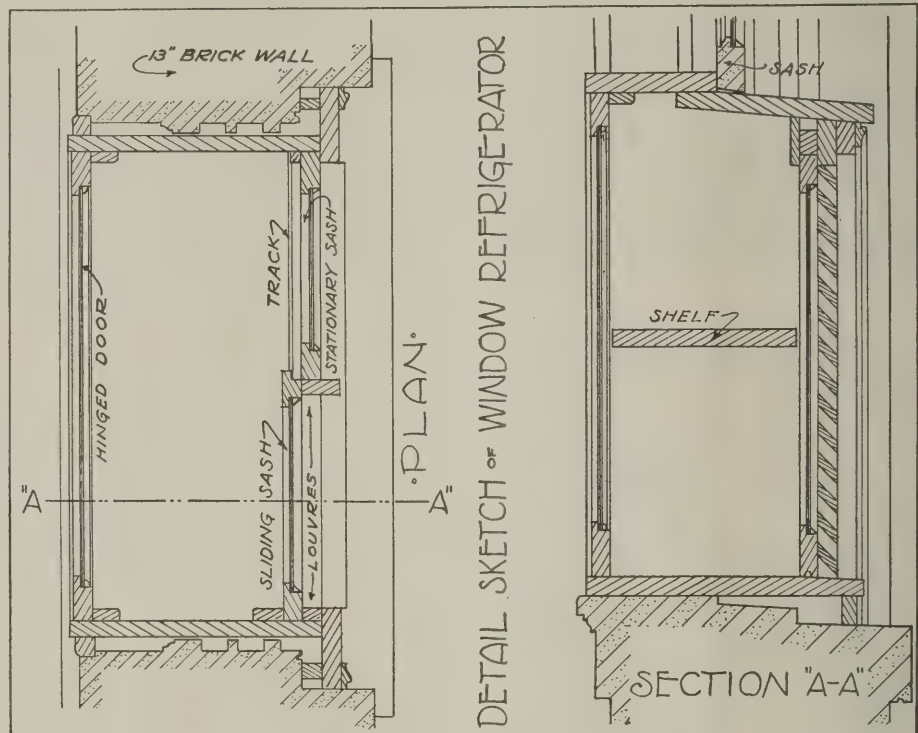
If owners ask tentative prices or estimates from builders they should be willing to compensate these builders for their labor and expense. Of course this does not apply in regular bidding.

As builders do not like to have their prices hawked among their competitors, they should not accord similar treatment to subcontractors and material men. It is a common practise for some contractors to use proposals from subcontractors or prices from material men to obtain lower ones, or else to favor some friend with work at the lowest price submitted. If this is to be done, they

should ask prices from such friends only.

The remedy for this practice is for subcontractors and material men to refuse to bid with a builder who treats them in this manner, unless he sets a time for receiving bids and bases his own estimates upon them, or after receiving a job lets the work to his subs at a public letting. The other remedy is outlined in the letter quoted.

A Window Refrigerator



ENTRANCES



Some Suggestive Types of Entrances

AN entrance should express the character of the house and conform to its design, and no part of the design of a building is more important. It should be both attractive and practical. It should be sheltered in some manner, either with a hood or by placing the door in a recess against the weather. Trellises can be used to good advantage, and flower boxes near the entrance can be used with happy effect. The builder while dealing with wood, brick and stone, is using these materials not only that they will hold together and endure but that they shall express beauty, utility and appropriateness.

1 A hooded entrance that has a modern English feeling. The use of white paint is a welcome change from the dark finish that is usually given to details in this style.

2 This one is a trifle too heavy to be Colonial, its proportions are those of the classic styles. A curved pediment, like this, adds grace to a composition.

3 A terra-cotta entrance to an apartment house. It is a graceful composition, well suited to the material of which it is made.

4 An entrance that leans to the Georgian style. Georgian is to England what

Colonial is to America.

5 A dignified entrance that isn't too formal to be homelike. To break a pediment in this manner without spoiling the composition, requires good judgment on the part of a designer.

6 Brick and wood may often be combined to form a pleasing entrance. Note the brick walk, and the moulded nosing for the steps.

7 A recessed entrance in the Colonial style. Note the good effect of the wood paneled walls and ceiling.

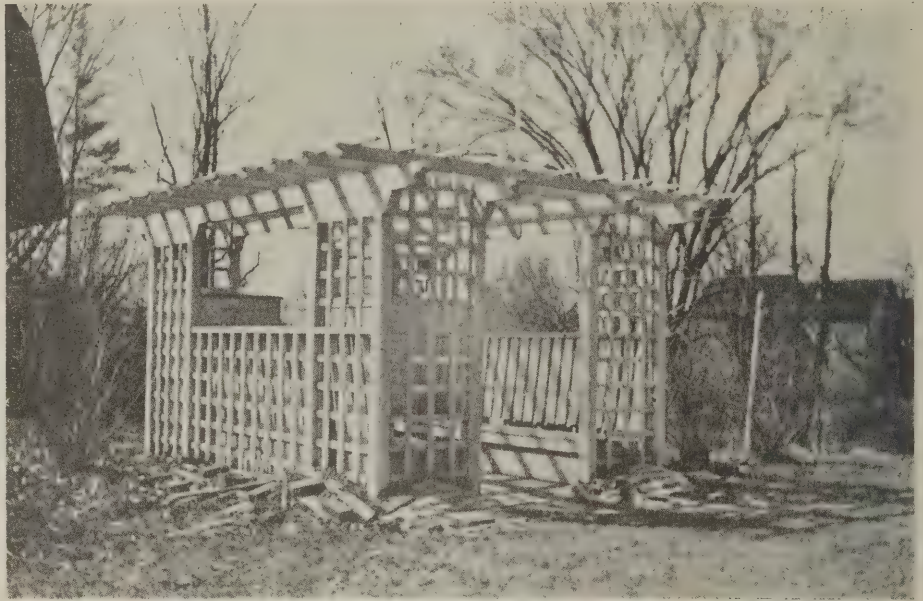
USEFUL AND ORNAMENTAL

THE average man often isn't concerned with purely ornamental things, but if you can give him something that serves some useful purpose as well, you can land him.

Such is the pergola seat that is illustrated. It is not only an attractive addition to the yard, but it is equipped with handy places to keep the garden hose, lawn mower, rakes, and all such tools that are usually stuck away—nobody ever knows where!

The sketch plan clearly indicates the layout and the photos show the construction.

A post hole digger will do all of the necessary excavating. The hole should extend below frost and be 10 or 12 inches in diameter. Pour concrete into the holes to within a foot or so of the grade level; set the posts in place and tamp concrete around them, using care to keep the posts plumb on all sides;

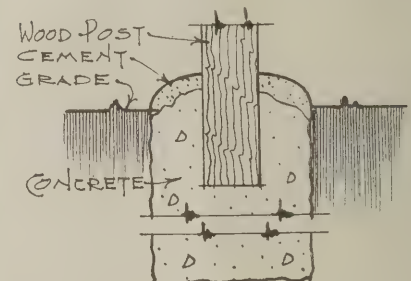


This might be called a camouflaged tool house



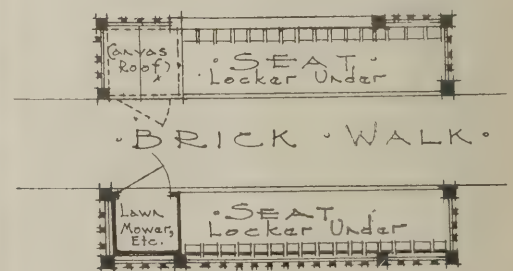
Note the flap door under the seat. This makes a good place for rakes, etc.

finish the top of the footing with a coat of rich cement mortar. The portion of the post to be embedded in concrete



• POST FOOTING •

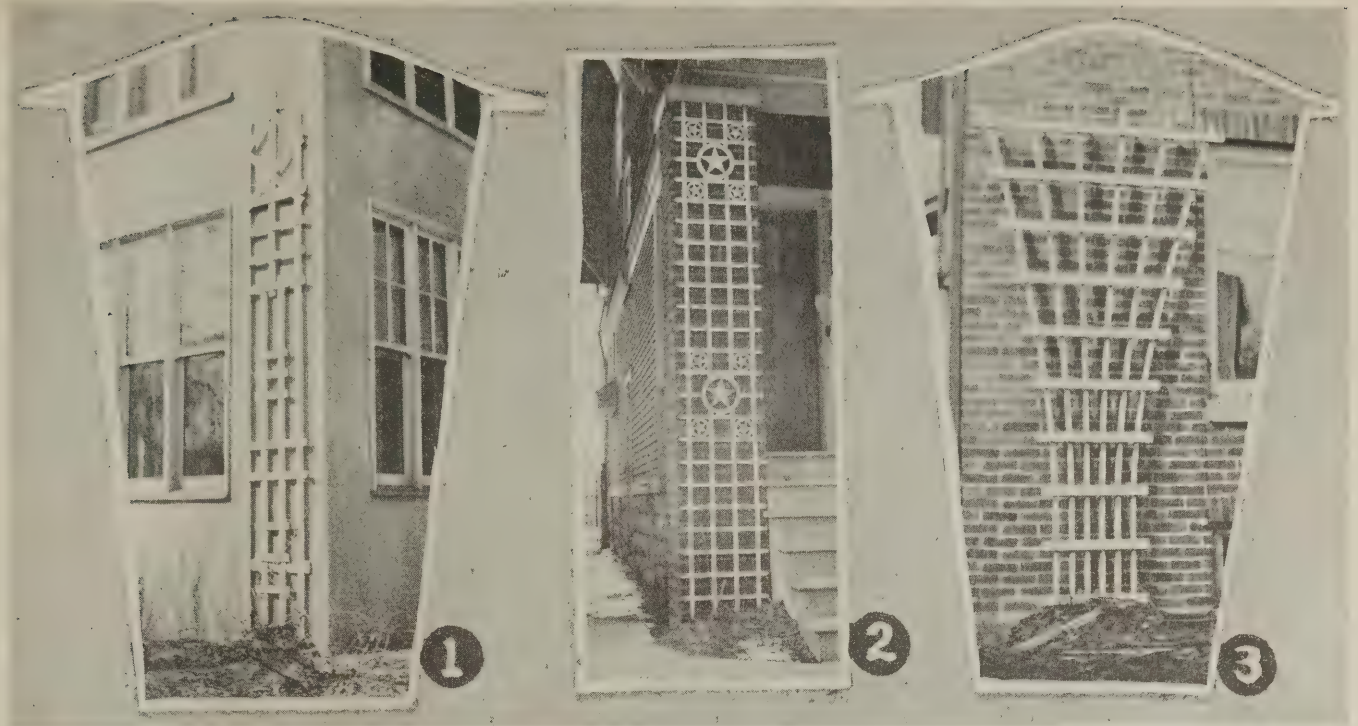
Scale 0 2 4 6 8 10 12 Inches



• SKETCH PLAN •

Scale 0 1 2 3 4 5 6 7 8 9 10 Feet

should be given a couple of coats of hot creosote or other preservative before setting in place. Don't allow the creosote to get on any portions that are to be painted, as it will discolor the paint.



1 This trellis would be more attractive if it were set farther from the wall to take full advantage of the shadows. 2 Patterns cut from the solid are often used to break up the monotony of a large number of simple rectangles. 3 The fan shape is often used on Colonial work, but it is usually appropriate for any style.

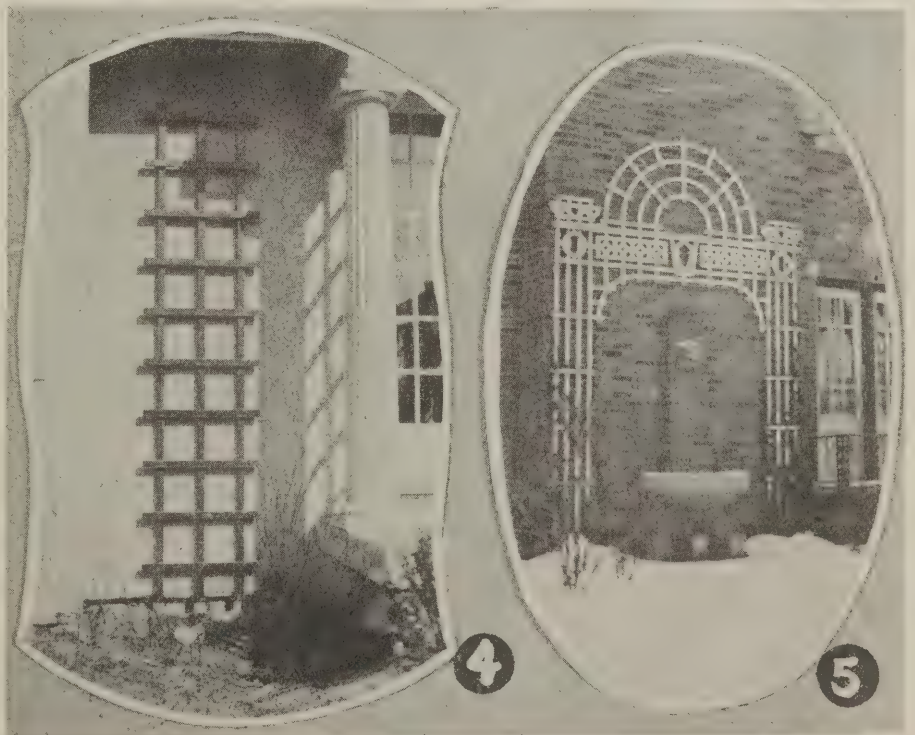
TRELLISWORK

THE builders' profession is such that he must be constantly alert to keep well informed about not only structural developments, but he must also be prepared to offer suggestions regarding artistic features of a design. In jobbing work especially the builder is called on to develop original designs and, in fact, a profitable business can often be built up by a builder who is prepared to turn out decorative features as a sideline. Trelliswork offers a pleasant means of exercising one's ability as a designer, and if the shop is equipped with wood-working machinery a large volume of this sort of work can be turned out in a short time.

In Europe the trellis is generally used merely as a garden accessory, but in America it has attained such a degree of popularity that it takes rank as an important architectural detail. There are examples of its use in our old Colonial work where its decorative value was recognized by those early builders who gave us the only lasting architectural style that we can call our own. In our modern work, however, the trellis has not been confined to the exterior of our houses, but is used in interior work as well. In fact the most elaborate trellis designs are those found in breakfast rooms, living porches, restaurants, ball rooms, theaters and the like.

For exterior work the chief value of trellises is to give an appearance of life

to a dead, flat, wall surface. A house that is cold and utterly without charm



4 Dark stain against stucco gives good contrast. Note the shadow thrown by another trellis placed between the column and the wall.

5 An elaborate form for an exterior trellis that is probably justified by its important location on the street side of a large residence.

can often be made attractive by merely adding a few well designed and properly placed trellises. To obtain the best results the trellis should be set three or four inches in front of the wall surface,

heartwood may be used. Trellises are commonly painted white, but green or stained ones to match the exterior trim are often pleasing. The bottom of the trellis should end three or four inches

combination with the trelliswork should be condemned; let the trellis design stand for itself, purely and simply. Interior trelliswork is usually nailed directly to the surface of the wall and no



6 Trelliswork is often appropriately used to shield the back or side door from the gaze of every passerby.

7 Forming a frame for the French doors and at the same time relieving the blank wall surface around them. No other decoration is required.

8 The hooded trellis gives just the right finish to the window; the effect would be tame without it.

9 The large trellis is placed several feet from the living porch windows and gives the porch more privacy.

so that it will throw a strong shadow. On wooden houses the trellis may be fastened to the wall by means of wooden blocks placed between the wall and the trellis. On masonry houses the trellis may be secured by iron straps either

above the ground to prevent early decay at this point.

Interior trelliswork is usually of an elaborate type employing circles, ovals, diamonds and other geometrical forms to give interest to the design. This sort of

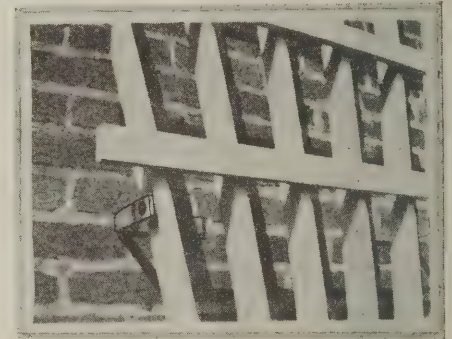
attempt is made to utilize the effect of the shadows. Sometimes the entire wall and ceiling surfaces are covered with



A good treatment for a public dancing room. Note the use of geometric forms, and the patterns that are obtained in the body of the screens by breaking the diagonal lines at certain intervals.

built into the wall or fastened to it by means of expansion bolts. The trellis is bolted to these straps. For general use, $\frac{7}{8}$ by $1\frac{1}{4}$ -inch strips are most satisfactory for making trellises and all nails should be set and be well clinched on the back. The wood used should be clear, straight grained and durable; white pine and cypress stand well, but almost any

work requires very careful workmanship as it must stand much closer inspection than is required of exterior trelliswork. A scrollsaw is indispensable for making the geometrical figures. The trelliswork may be painted white or may be tinted some soft color, or several colors may be combined in one composition. The use of artificial flowers in



The iron strap is secured to the wall expansion bolts and the trellis is bolted to it.

trelliswork, but this is expensive work and usually the trelliswork is only used to form a frame around openings, with possibly a few wall panels here and there.

Many other attractive uses of trelliswork will suggest themselves to the ingenious builder. It may be used instead of balusters for stairs, as screens to hide radiators and other unsightly objects and in general may be used to good effect in almost any place where it is desired to obtain an effect of lightness and to give interest to a plain surface.

If you ask more, Mr. Builder, you may find that a lot of things you are working at can be done in an easier and a more economical way. Why not send in your problems to National Builder? Remember, this is "your paper."

SILENT PLUMBING

By Ernest Irving Freese

The Cause and Elimination of Disagreeable Noises Resulting from the Operation of Plumbing Fixtures

IF a table-top be struck a blow with a hammer, a loud noise will be produced. But, if the ground be struck a similar blow with the same hammer, the audible result will be only a slight sound. The table-top, being a comparatively incompressible body, does not at once absorb the force of the blow. Rapid vibrations are therefore set up which result in the loud noise. On the other hand, the ground yields almost immediately to the force of the blow and thereby acts as a "cushion" which absorbs and deadens the sound of impact against it.

"Water-Hammer"

Water, confined in a pipe, is practically incompressible. Hence, if the flow of water be stopped by the sudden closing of a faucet, the momentum of the moving water will produce a decided vibratory impulse against the closed valve which, in turn, reacts and produces a vibratory impulse throughout the immediate piping-system, in the same manner that the hammer produces a like impulse in the table-top. In fact, the former impulse is the cause of what is technically known as **water-hammer**. And, mark this, if water-hammer is not absorbed, or "cushioned," a disagreeable pounding noise, with which we are all familiar, is heard throughout the house whenever a faucet is closed suddenly.

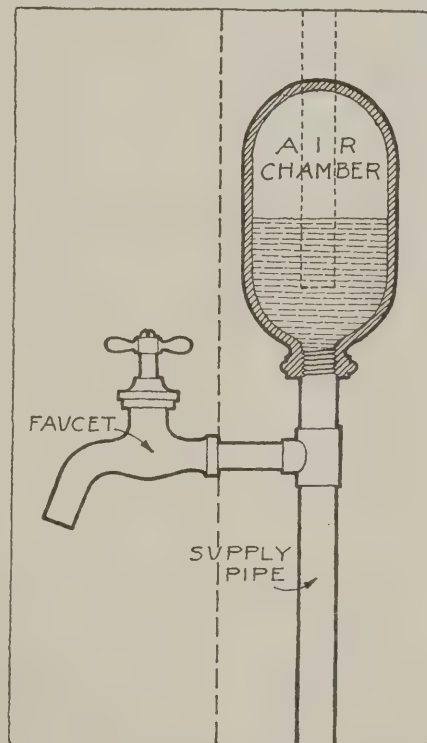
The noise resulting from water-hammer can be entirely eliminated by reducing the water-pressure to the minimum by installing a pressure-regulating valve on the main supply-pipe, and then using large slow-closing faucets and large-size supply-pipes to the various fixtures. If these precautions are not taken at the time the piping-system is installed, then the only remedy is to insert vertical air-chambers in the system either above or below each outlet, thus providing a compressible cushion of air at each fixture so as to absorb the impact of the suddenly-arrested flow of water and eliminate the vibrations, and consequent noises, caused by the closing of the faucet.

An Air-Chamber Device

An approved type of air-chamber, for lavatory or bath-tub supply-pipes, is shown diagrammatically in the accompanying sketch. The enlarged air-chamber is placed directly on the supply-pipe

where it is in a position to receive and absorb the initial impact of the moving column of water. Air-chambers should not be placed at the side or bottom of a pipe, for, if so placed, they will there become water-filled and useless. It is best to place them immediately above the faucet, as shown, rather than immediately below it, for, in the upper position, they will become periodically and automatically re-charged with the air that is always released by the reduction in water-pressure caused by the opening of the faucet.

Ordinarily, air-chambers can not be installed in an existing system of piping without first removing the plastering



A type of air-chamber that prevents "water-hammer"

sufficiently to allow of their entrance into the wall. Where necessary, however, this removal of the plastering is a small matter compared to the advantages gained by the installation of the air-chambers.

The dotted lines in the sketch indicate the continuation of the vertical supply-pipe, or "riser," to the next floor above, if same is required. This is entirely practical, and interferes not in the

least with the proper and efficient operation of the air-chambers on each floor, for, as will be seen upon an inspection of the sketch, the upper supply-pipe, shown in dotted lines, extends far enough into the chamber to form an effectual "water-seal" for the contained air.

Another disagreeable sound, which might properly be termed a "hiss," is often heard upon the opening of a faucet or the operation of a water-closet. While this particular noise has nothing to do with water-hammer, yet the same measures that eliminate water-hammer will silence the hiss; namely, low pressure and large-size supply-pipes and outlets.

Main supply-pipes should not be less than 1 inch in diameter for a house of one or two bath-rooms; 1½ inch for a house of three, four or five bath-rooms; and 2 inch for six to nine bath-rooms.

Noise From Soil-Pipes

The noise of waste water flowing through soil-pipe from water-closet fixtures can be practically silenced by using not less than three-inch soil-pipes in the partitions, and then boxing them and filling the enclosed space with some non-sound-conducting material.

Water for flushometer-equipped water-closets should be supplied by an open tank in the attic, for it is almost impossible to silence a flushometer that is connected directly to the main supply-pipe.

All piping coming in contact with timber work should be enwrapped with a short length of split rubber hose so as not to transmit vibration, and the resultant rattles and other noises, through the partitions and floors. And it is a wise precaution to have all risers and distributing-mains boxed and then packed in mineral wool or other sound-absorbing substance.

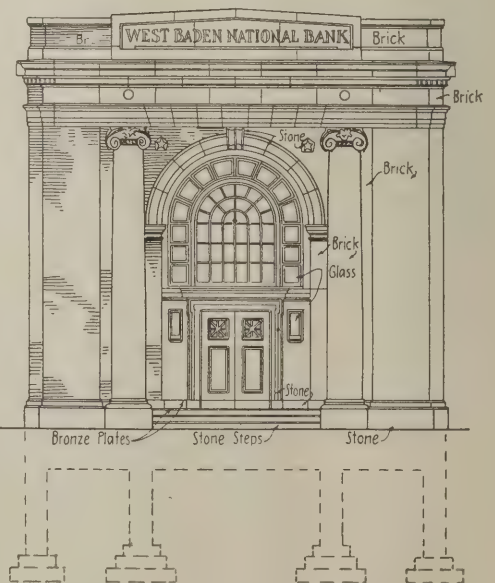
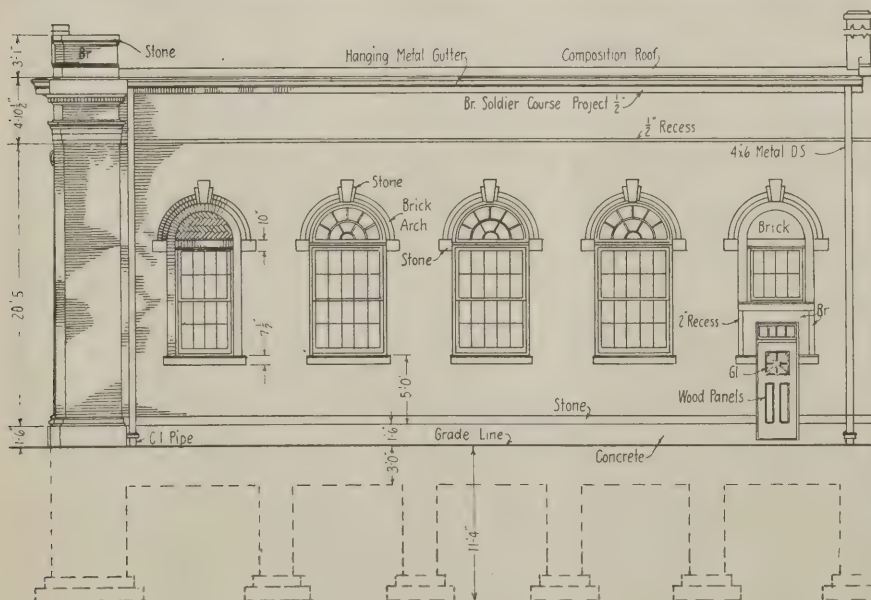
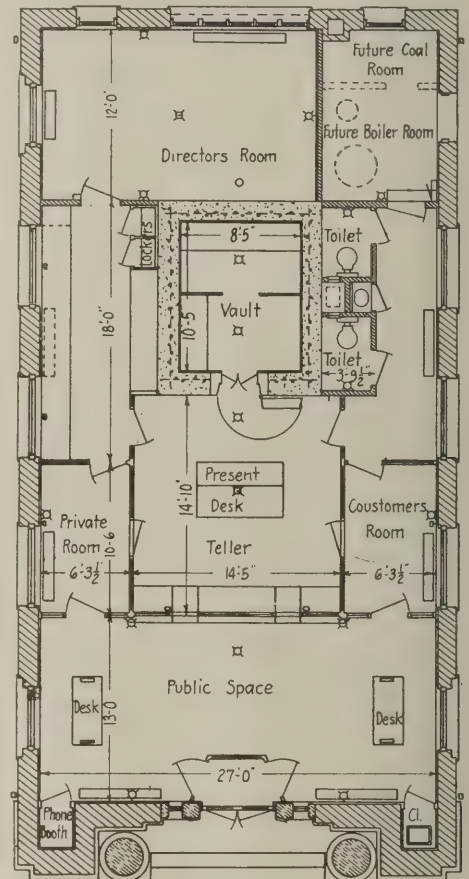
Finally, if an utterly "silent bath-room" is desired, then the walls, floor and ceiling of same should be constructed of two independent sets of timbers, in such a manner that the bath-room virtually becomes a "room within a room," its inner shell separated from the main walls and floor of the house by a space of an inch or more, and connected to the main walls only where absolutely needful for structural support.

A Village or Town Bank---P. J. Weber, Architect



THE smaller banking institutions require no more than a single, large and well-lighted room, in which the working space is screened from the public lobby by low partitions.

In the accompanying plan the receiving and paying teller occupy one enclosure that has direct access to the vault. One man, if necessary, can, thus, tend to the duties of both. To the right



of the teller cage is the room of the customers; to the left, that of the cashier. To the rear lies the directors' room, screened off by a low partition. It may be used for larger transactions of a private nature.

The floor level of the boiler room is depressed two or three feet, permitting

heating pipes to extend below the main floor. This arrangement obviates the necessity of a basement. The entire floor is a reinforced concrete slab supported on piers.

The vault is constructed of concrete, reinforced by horizontal and vertical steel bars. Its interior is divided into

two sections by means of an iron screen. One portion is for the deposit boxes; the other for the cash of the bank.

In as much as all partitions and counters are part of the building construction, the expense of the equipment is practically nominal. A bank building, such as shown, can be erected for about \$16,000.00.

A Bungalow Court

THE builder who doesn't keep abreast with the latest developments in both planning and the modern equipment of buildings, is holding himself back. If

a home for the feeble minded. Yet there are men engaged in the business of building—which has its vagaries of style, just as clothing has or foods, or any other

year and rest on your laurels between jobs. You may know that your buildings are built "in a good and workmanlike manner"; no one criticises them on ac-



A compact arrangement for a wide lot. The ventilators in the gables provide a good circulation of air that goes far toward rendering the houses livable in summer.



This is a good layout for a small lot. Three units are grouped along one side with an open space along the other



A development along Italian lines. The planting is of a formal type which goes well with the building

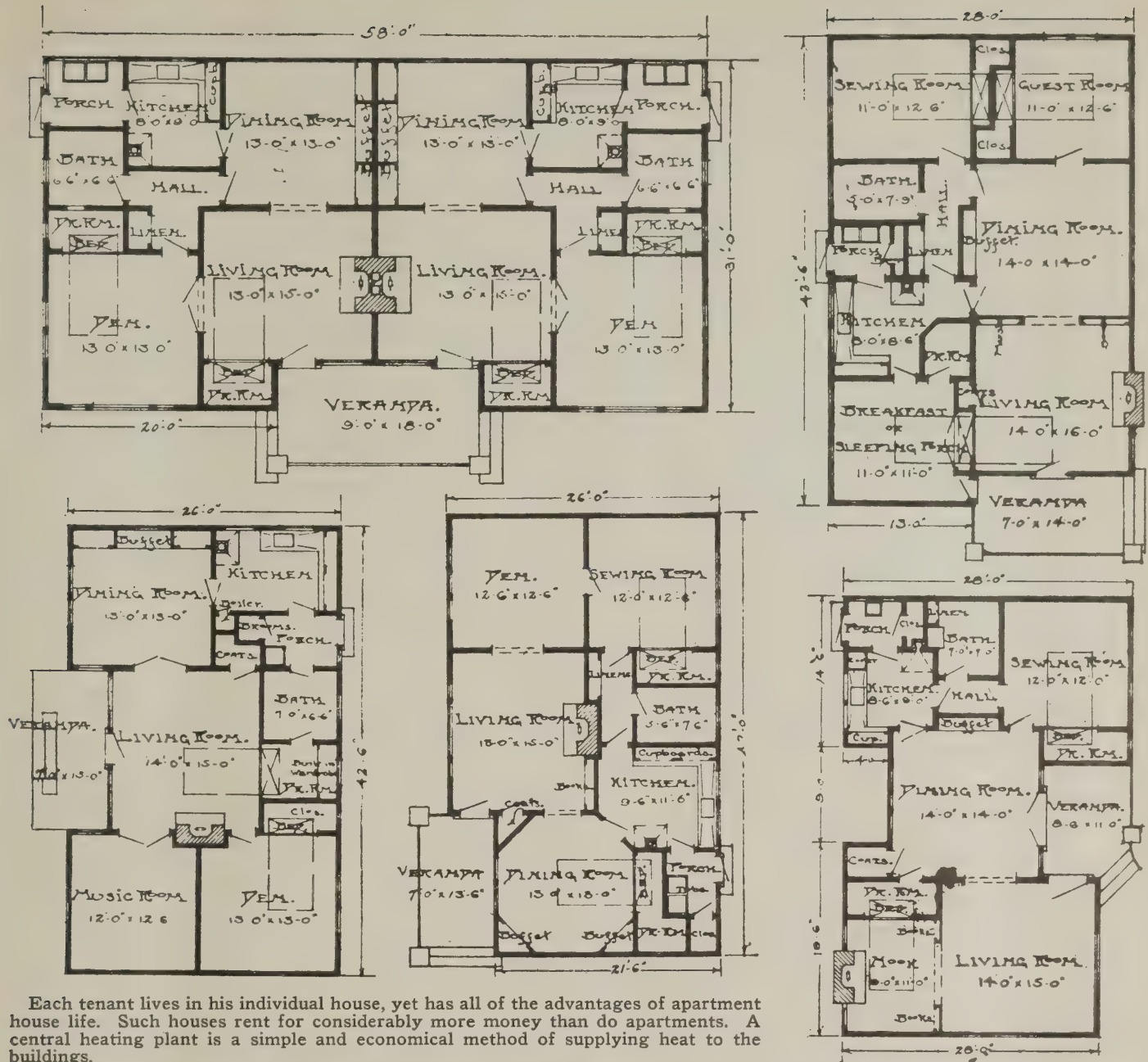
a merchant tried to do business today in the same manner and with the same goods that were popular twenty years ago, he would not only go broke, but would wake up some fine morning to learn that his friends had placed him in

commodity—builders who do not seem to realize the importance of keeping their ideas up to date.

Does this Mean You?

You may put up a few buildings everynot only for the money there is in it,

count of materials or workmanship, and you have the satisfaction that comes from a job well done. But one day you will hear of a **regular** job. A bang-up good piece of work that is worth while



Each tenant lives in his individual house, yet has all of the advantages of apartment house life. Such houses rent for considerably more money than do apartments. A central heating plant is a simple and economical method of supplying heat to the buildings.



This group will lose its bare appearance when the planting has reached its full growth



A typical layout of the smaller kind. Each unit is a complete bungalow

ments is the apartment house. It is here to stay and its influence is constantly extending until it is a matter of only a few years until practically every town will boast of one or more of these modern buildings. As a whole, apartment houses may be grouped into three general types; first, those buildings two or more stories in height, each story of which is divided to furnish living quarters for several families.

Second, we have the so-called bungalow court, which is a direct descendant of the first type. If the first type may be likened to a hotel, the bungalow court may be likened to a private home, as the characteristic feature of the bungalow court is the fact that each living unit is entirely detached from the others. Each unit is a separate building, complete within itself. Third, is the bungalow-apartment. This type combines many of the characteristics of the two other types. Just as in the apartment house, the units in this type are covered by the same roof and have division walls in common, but the general layout is different, that is, an attempt is made to give a separate home feeling to each

unit by arranging a separate entrance for each apartment without using halls, etc., in common.

The flexibility of the plans of both the bungalow apartment and the bungalow court is a very attractive feature to investors. Only enough units to try out the scheme need be built at one time, and the improvement may be gradually expanded until all of the available ground area is utilized. All of the lot may be used, as the rear portion is rendered equal in value with the front.

As the principal factor in any type of investment building is to make every inch an income producer, it is necessary for a designer to be thoroughly familiar with space saving equipment. By using wall-beds, buffet kitchens, etc., he can make rooms do double duty, saving money for the investor and making a reputation for himself.

Wall beds take up little space and have of late years been developed until they are entirely practical and satisfactory; in fact many apartment dwellers have them installed in their own homes when they build, as they have found that in using them they need fewer rooms,

which means not only less expense, but also less housework.

Buffet kitchens are also great space-savers. They are completely equipped with stove, oven, sink, refrigerator and compartments for food and dishes. They are developed along the lines of the common kitchen cabinet which has proven such a labor saver to the housewife and have attained increased popularity with those who have used them. They may be obtained in either steel or wood and the complete outfit can be built into a space two feet deep by seven and one-half feet wide. When not in use they are hidden from view by double doors.

Built-in dining alcoves are so popular that they require no description. They offer all of the advantages of a table and chairs and may be tucked into a nook out of the way.

Plants and Flowers

One important feature that must not be slighted is the value of the main entrance to the court and the planting of the grounds. Of course these features are not exactly in line with the builder's work, but he must be prepared to advise the investor about such things.

Exterior Stains

THE best stains for exterior wood-work are made by mixing suitable color pigments with oils which have good penetrating qualities combined with durability and wood preservative features.

Refined creosote oil has these properties and, as it is comparatively cheap, it is usually used as a base for this class of stains.

Creosote stains were introduced in the

late eighties and at first were used only for shingles and on rough sawed surfaces, but their popularity has grown until they are now used as a finish for dressed lumber as well. A stained finish



The semi-rustic bungalow depends largely upon the irregularities and grain of the woodwork for its character



Nature takes kindly to stained woodwork. It follows out her own methods—softening and blending the lines

for cornices, for wood trim for stucco houses, and for dressed siding is now often preferred to paint. Even so, it seems better adapted to rough surfaces than to smooth ones.

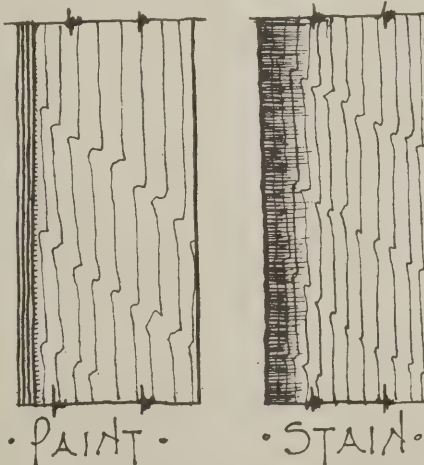
Paint as a Preservative

The preservative qualities of paint depend almost entirely upon its effectiveness as a seal between the wood and the weather. It does not penetrate the wood to any marked extent, but merely forms a water-proof skin over the surface. It fills the exposed pores, and if the wood is not thoroughly dry, the air tight seal will not allow the moisture to escape readily and the wood will decay under the painted surface. The best of white lead paints gradually oxidize, this causes them to chalk and eventually to check and split, while zinc white will often flake off in patches. These breaks are not only unsightly, but if the seal is not immediately renewed by repainting, moisture will penetrate the wood and decay will begin.

Penetrating Qualities

Creosote stain penetrates the wood so freely that it may be said to become a part of the natural structure of the wood itself. It expands and contracts with it and cannot peel off nor crack. It penetrates the pores but does not clog them; it repels moisture but does not confine it. Its most valuable characteristic,

however, is due to the fact that it poisons the wood which forms the food of the minute fungi which are responsible for all of the decay which takes place in



Exaggerated diagram comparing action of Paint and of Stain when applied to wood surfaces.

wood. This is the principle upon which the preservation of wood is based.

Impurities

The creosote oil base should have all of the objectionable features of crude creosote oil eliminated. The stain should be transparent and free from coarse pigments, kerosine oil, benzine and other adulterants. It is made in a wide va-

riety of warm, transparent colors and comes ready mixed, in packages varying in size from one gallon cans to fifty gallon barrels.

Durability

Creosote stain is most durable and the fading, which results from the exposure of any color to sunlight, is in this case a desirable feature which adds to the softness and harmony of the finish. Good stain never turns dark and one coat will entirely renew it. By using creosote bleaching oil a silver-gray color is produced. When the bleach is first applied it colors the shingles slightly, but in a few weeks the surface takes on a silky, weathered appearance that is very effective. This color improves with age and requires no renewal.

Skill Not Required

It does not require any particular skill to apply creosote stain as it comes ready for use and is a thin-bodied easily spread liquid that dries rapidly and does not show laps nor raise the grain. In brush work the surfaces are cleaned as for paint, and the stain is applied with a heavy brush. Always stir the stain thoroughly just before applying as the pigment soon settles to the bottom of the container and if not thoroughly mixed with other oil the stained surface will not be even in color. Never use less than two coats on rough wood.

For smooth wood, three coats are not too many to insure durability and uniformity of color. For two-coat work, a gallon of stain will cover a square of rough surface, or from two to two and one-half squares of smooth surface.

Shingles may be stained by the brush method after they are laid, but the dip-

ping method makes a more durable job and prevents shrinkage cracks from becoming so evident. It is considered good practice to give dipped shingles a brush coat after they are laid, to cover the raw edges left by cutting the shingles around hips, windows, etc. In the dipped method the shingles are dipped

into the stain for at least two-thirds of their length and thrown into a loose pile to dry. One man can dip about 7,000 shingles per day. A thousand shingles will require from $2\frac{1}{2}$ to $2\frac{3}{4}$ gallons of stain for a dip coat and 3 gallons for both dip and brush coats.

It is now possible to obtain shingles



English half-timber work should be made of rough sawed lumber, stained to a silver-gray tone. Too much contrast between stucco and woodwork is not pleasing.



This one has an open rafter cornice and the soffit is painted white. This helps the light in the second story rooms



A "Japanesque" design of stucco, field stones, and stained wood work, which forms an attractive composition



Stained wall surfaces trimmed with paint offer a cheap and attractive means of finishing a wooden house of the modern type.



A stucco house with stained trim is always pleasing, provided that the trim does not "cut up" the surface too much



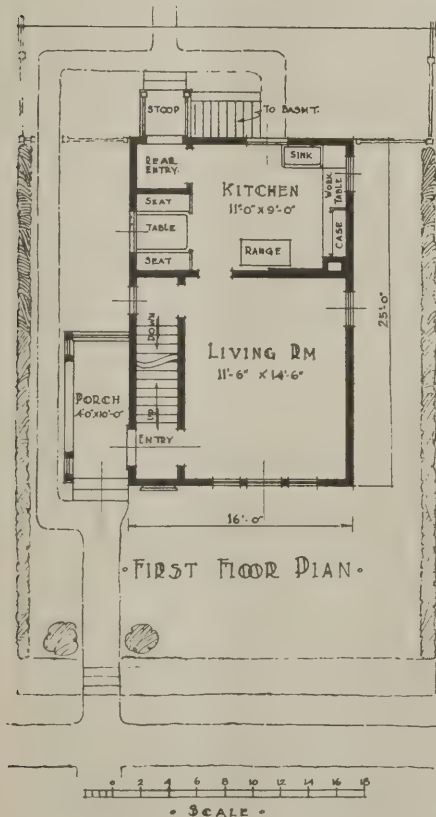
The Swiss chalet style demands stained woodwork. There is no other satisfactory way of treating it

that are stained and ready for use. These are very desirable as they are more thoroughly impregnated with the stain and cutting and trimming has less effect on their durability.

Where roof shingles are stained and the roof water is to be used for house-

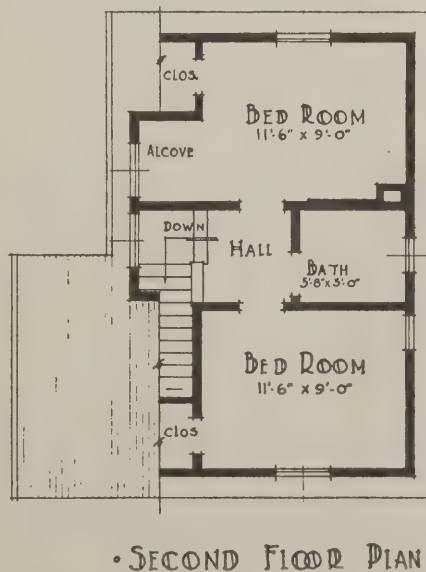
hold purposes, it will be necessary to waste the water of several rains, as the water will taste of creosote for several weeks after it is applied. The ready stained shingles are usually free from this objection as the free oils have evaporated from them before they are applied.

A Little House at Low Cost



This house was designed to meet the demand for a small house for a person of moderate means. It combines attractiveness with its practical planning, and has every convenience, except size, which goes into more expensive houses.

This house can be built, according to the architect, complete for occupancy, for \$2,000.00.



If I Were a Builder

By a Buyer

IF I WERE A BUILDER I wouldn't let a customer insist on my building him a freak house without telling him it was a freak, so he wouldn't be sore at me afterward.

The writer once wanted to put up a house; a certain lady had something to say about it too; and we went to a local builder and conferred with him. I had some pretty strong ideas, and the lady had some strong ideas, and the builder unloaded on us a few of his ideas. And that house was the direct result of the compromises between three different people. And believe me, it was some house—or better, some **freak**. I have hated that builder ever since, hated him quite as fervently as I have disliked the house. Of course that is not fair to the man, who did his best to execute another man's whims, but the moral is this: The builder is an expert; when a crank, or amateur builder or whatnot, comes to him with a crazy-quilt plan, the builder should conscientiously point out to the misguided man the defects of his bad dream, and thus absolve himself of future blame. "Please your customer," yes, but don't enthusiastically applaud a fool plan when your own good sense rejects it as freakish or impractical.

* * *

IF I WERE A BUILDER I'd always let my chimneys stay their natural red and white, assuming that the construction is of red brick and mortar. Is anything in the world cheerfuller than a red-and-white chimney rearing its head Heavenward? Why smear paint over that fine natural, cheerful red-and-whiteness?

* * *

IF I WERE A BUILDER I'd try to be a thinker and a doer and not a moss-back. Do you realize that the world has moved along a lot in business methods?

In the old days, the man who wanted construction work could just smoke his pipe inside the doorway, confident that when someone wanted something done, the call would come.

But modern business is different. The capable man goes out and **creates the want!** In this connection, here is a rich sentence for you, brother: "The great business man both creates and satisfies the want."

* * *

SO, IF I WERE A BUILDER, I would know every vacant lot in my town; I'd have its exact measurements; I'd try to know what it cost, what price it was held at, what it was assessed at. And then I'd determine to get a building

on that lot. I'd study all the facts, consider location, trend of growth, competitive businesses, etc., and I would, when all was clear in my noodle, approach the owner of that lot with a perfectly worked-out plan for a building on that lot. And if the owner didn't fall, then I'd go to some local investor with my plan, and with details as to the price of the lot, etc. And somehow, by hook or crook, I'd get someone to improve that lot and give me the contract for it.

* * *

IF I WERE A BUILDER I would get well acquainted with other builders; I would be a member of the local builders' association and if there was none in my locality I would join the National Association and get action to form a local association even if but three or four builders could be brought together. I would join the local board of trade, or chamber of commerce, or whatever organization represented the business interest of the town and I would make it known that I was a Builder. That I thought in terms of Homes, fine business structures, schools, churches—of all the advantages of structural effectiveness, and not in the terms of lumber, brick and mortar—but in what they made and what they represented under my hand.

* * *

IF I WERE A BUILDER I would tell my brother builders in the association all the difficulties I encountered and what I did to overcome them and how it came out. Why? Because in helping them they would not be so likely to make the same blunder that I did and take jobs under a mistaken idea that they could get away with it. That is the most selfish motive, of course, so I put it first. But really the biggest and best motive is that if I never got anything—if I even lost in a money way by telling my experience, by giving it away, I would still gain in my moral fiber more than I could lose in money.

* * *

IF I WERE A BUILDER I would go after quality and not price in my work. I would not accept any loosely drawn specifications. I would want everything I was to deliver set down in unmistakable terms. If the architect made an oversight or the owner, or I suspected they wanted one thing though it looked like they wanted another I would have that cleared up there and then.

* * *

IF I WERE A BUILDER I would make it my unvarying practice to show that what is cheap is cheap. I would collect evidences of this fact. I would have the various kinds of construction to show the difference—drawings, models, samples—notes on the merits of

each and of where they had been used.—a little museum in fact. Just as a tailor shows you domestic or imported goods—they will be cut and fitted to your measure, each the same, but the goods are different and so the price is different.

* * *

IF I WERE A BUILDER I would get next to the banker of my town and find out the men who were sound credit—I would plan with him to turn renters into home owners. I would get next to the material men and get cooperation all along the line to get the townsmen

interested in an "Own Your Home" campaign. I would show plans, photographs of houses that I had built, and keep my word as good as my bond.

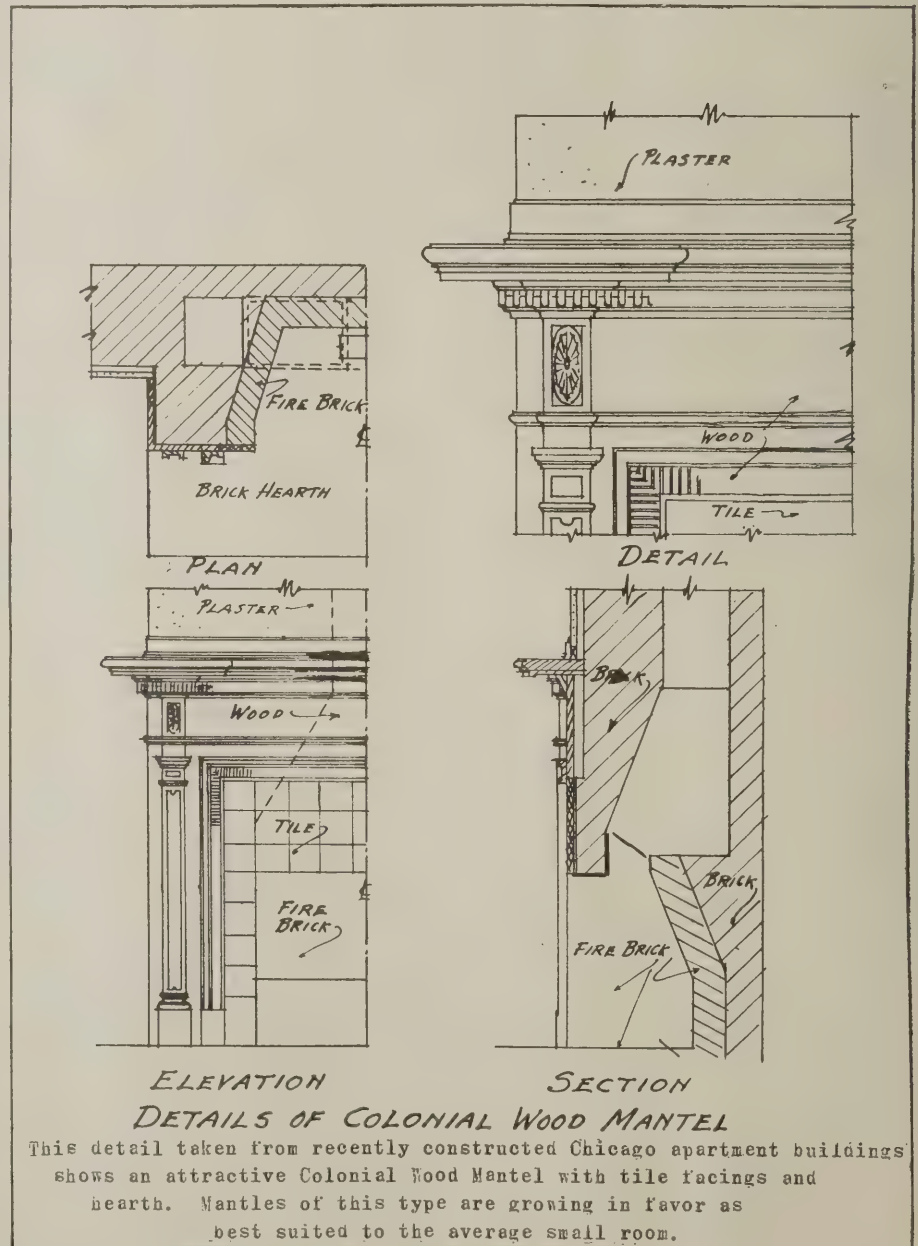
* * *

IF I WERE A BUILDER I would make it so easy to do business with me that owners would not need to have an architect police my job for I would be the owner's other self—working for his interest as I am working for my own.

* * *

IF I WERE A BUILDER I would scorn to act a lie in my building as I would scorn to tell it.

∴ Colonial Mantel Details ∴



FOR THE RURAL BUILDER

The rural builder who keeps in touch with the best "dope" on farm construction, gains a lot of free advertising thereby. These details for the hog lot were worked out by the Agricultural Experiment Station of the University of Wisconsin, and are well worthy of study.

The cement hog wallow should be located in a shady place and made so as to contain from eight to ten inches of water. (Fig. 1). Crude oil or coal tar dip, poured into the water, will help keep swine from lice and their skin in good condition.



Fig. 1—The Cement Wallow

Cement feeding floors and V-shaped troughs can be used to good advantage on any hog farm (Fig. 2). If the feed-



Fig. 2—A Cement Feeding Floor Saves Feed

ing spot is located in a protected place inside feeding will be unnecessary except at farrowing time.

Little pigs begin to eat grain at from

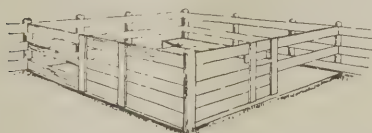


Fig. 3—Creep for Feeding Small Pigs

three to four weeks of age, and should be provided with a small pen or enclosure (Fig. 3) where they can feed separately from the sows.

The portable fence (Fig. 4) is made to enclose the portable house and for en-



Fig. 4—Fencing in the Feed Lot

closing temporary quarters and lots. The panels are held erect by the supports which should be nailed to stakes driven into the ground.

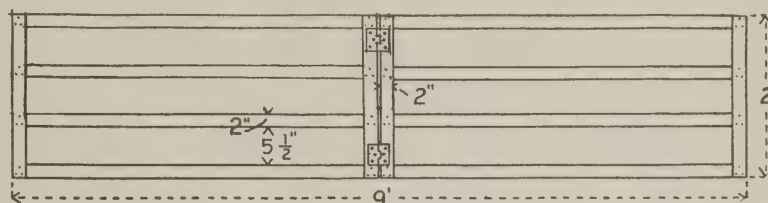


Fig. 9—A Convenient, Easily Carried Hurdle

Hurdles, or portable fences, (see Fig. 9) may be made in single panel lengths, but the hinged hurdle is more useful in sorting and catching pigs.

to get out from under her when she lies down. The fender also makes a warm corner in which young pigs may rest away from drafts.

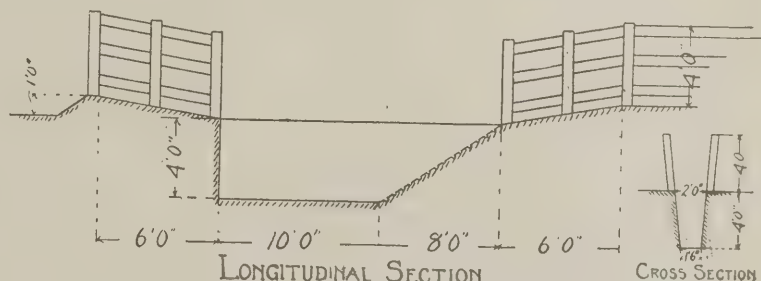


Fig. 8—A Cement Dipping Tank

Warm weather is the best time to dip. A tank such as shown in Fig. 8 is suggested to be built ready against dipping time. Two or three treatments per year will usually keep the herd free from parasites.

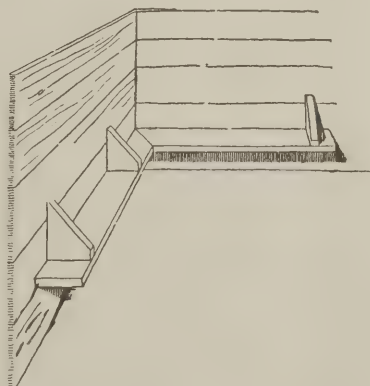


Fig. 5—Corner of Farrowing Pen Equipped With Fender

The fender of a farrowing pen (Fig. 5) is a 2x6-inch strip placed about eight inches above the floor and extending out into the pen six inches. This compels the sow to lie away from the corner of the pen and gives the little pigs a chance

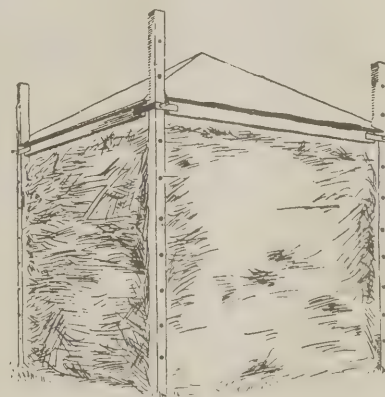


Fig. 6—An Adjustable Roughage Stack Cover

Roughage, stacked in the hog lot where it can be easily thrown down for feeding sows in winter, should be protected by a cover. A simple roof adjustable on four corner posts is satisfactory. See Fig. 6.

For feeding alfalfa, clover, soy bean hay or other coarse feed, a rack of the kind shown in Fig. 7 is handy and prevents waste. More simple racks are often constructed on the inside of a hog house by placing them against one of the sides of the building or adjoined to the pen partition.

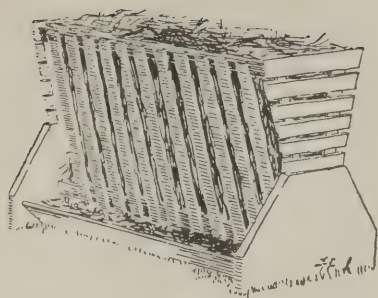


Fig. 7—A Roughage Feed Rack for Swine

It is worthy of consideration that these suggestions have a much greater importance at this time than in the past. The high cost of every sort of material and farm produce particularly gives a large opportunity to the builder who knows not only how but why.

Builders should know as much or more about where farm buildings should be as farmers themselves, and should be in a position to give advice from the best experience, for the location of farm buildings is of the greatest importance in saving time and labor. If a building is put in the wrong place the builder will get a good share of the blame for it anyway.

A different problem is present on different farms, so that it is impossible to lay down hard and fast rules for locating farm buildings. Local conditions, such as natural drainage or slope, will affect the location to a great extent. F. A. Meckel, of the University of Missouri College of Agriculture, gives the

following suggestions for the location and arrangements of farm buildings.

1. The farmstead should be conveniently located with respect to the fields.

2. The farmstead should be near an improved road.

3. The barnyards and lots should be well drained, either by natural drainage or tiles.

4. Eave troughs emptying into drains or cisterns will eliminate much mud in barnyards.

5. An exposed hill is undesirable, but a south slope is to be desired.

6. A timber windbreak will prove valuable on the north and west of the farmstead.

7. The buildings should be grouped around a central courtyard.

8. The corncrib and granary should be convenient to the barn and hog-houses.

9. A water supply must be available. Running water in house, barns and yards is a great convenience.

10. Barnyards should not face the house or road.

11. The barn and yards should be 150 to 200 feet from the house, and not in the direction of the prevailing winds.

12. The house should be set well back from the road to avoid the dust.

13. The house should command a view of the barn door, the front entrance from the door, and the central courtyard.

14. The shop and implement shed should be handy to both house and barns.

15. The poultry house may be nearer the house than the other buildings, but should be so placed, if possible, that the chickens will not overrun the yard.

16. The planting of shrubs in corners improves the appearance of the farmstead.

17. Good fences are to be advocated.

18. All buildings and fences should be kept painted and in good repair at all times.

19. Concrete walks from road to house and from the barns to the house will eliminate the tracking of dirt into the house.

It will not be possible to include all of these suggestions in one farmstead, but as many as possible should be used.

Builders who give much attention to farm building construction have an opportunity of keeping posted, as the agricultural extension service of the University of Missouri College of Agriculture, Columbia, Mo., will give assistance in the arrangement of farm buildings by correspondence or personal interview.

A Public Market



One way of combatting the high cost of living is to build a market place where the producer and consumer may deal with each other directly.

The market place illustrated is in Madison, Wisconsin, and is built of reinforced concrete. Almost any town is a suitable location for an enterprise of this kind and in fact, it seems to have been proven that a public market is more successful in moderate sized towns than in large cities. This is probably largely due to the fact that the residents of smaller places are more interested in local enterprises than are city dwellers.

There are several ways of financing a thing of this kind. It may be built by the town and known as a municipal market; private capital may be interested from the investment standpoint, or farmers' organizations may undertake the scheme. It seems that at the present time, when every one is interested in any scheme to reduce the cost of liv-

ing, a builder could derive some valuable publicity by promoting a public market. He could well afford to do the work at actual cost and the local material men would no doubt finish the materials on the same basis. The ground could be bought outright or leased for a small sum.

The building may be of wood construction or of concrete. In any case the ground around the building should be paved so that buyers will not be kept away from the market during muddy weather. Concrete makes a durable and inexpensive paving in most localities.

The logical way to promote a public market would be by approaching the farmers first, for without their co-operation the scheme will be a failure from the beginning. Get your local newspapers interested, and through them the general public. Try to keep the element of profit out of the scheme. The rentals for stalls should be either free, or at least, very nominal.

Practical Barn Plans

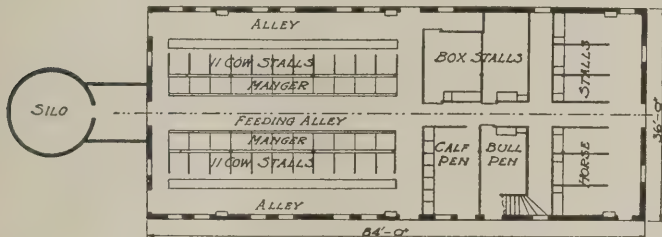
THE five sketch plans illustrated are based on barn plans developed by the Agricultural Engineering Department of the University of Wisconsin, Madison, Wisconsin. Complete working blue prints, showing $\frac{1}{4}$ -inch scale plans and elevations and detailed drawings of the framing, may be obtained from the above department, for twenty cents each, for

The general arrangement of plan No. 2 is similar to No. 1, but the cows face out and the silo is placed at the side to permit driveway through the center.

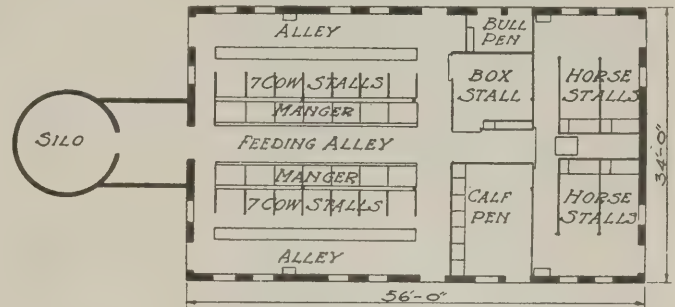
Plan No. 3 is designed for a farm of 80 to 120 acres. The cows face in. It

is merely a condensed form of the No. 2 plan.

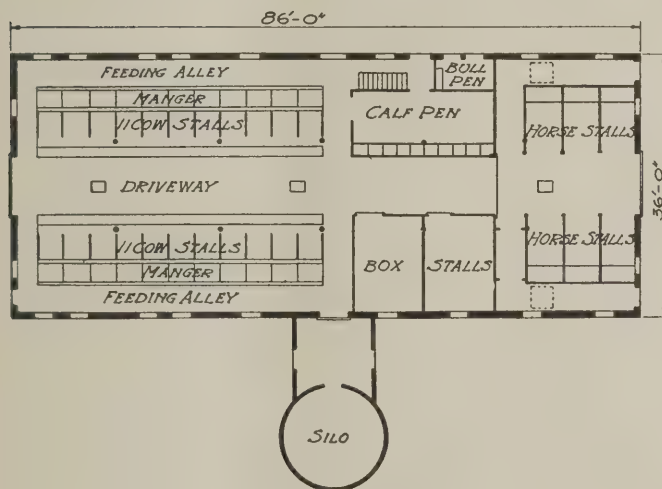
Plan No. 4 is designed for the settler farmer. It is planned so that one-half may be built for present needs and the other half can be added at any time



Plan No. 1—General purpose barn



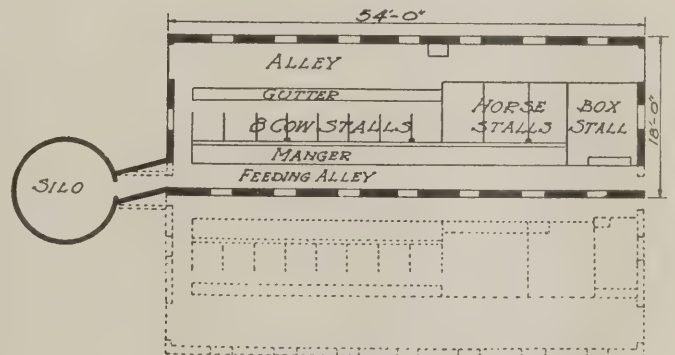
Plan No. 3—General purpose barn



Plan No. 2—General purpose barn

when accommodation for more stock is required.

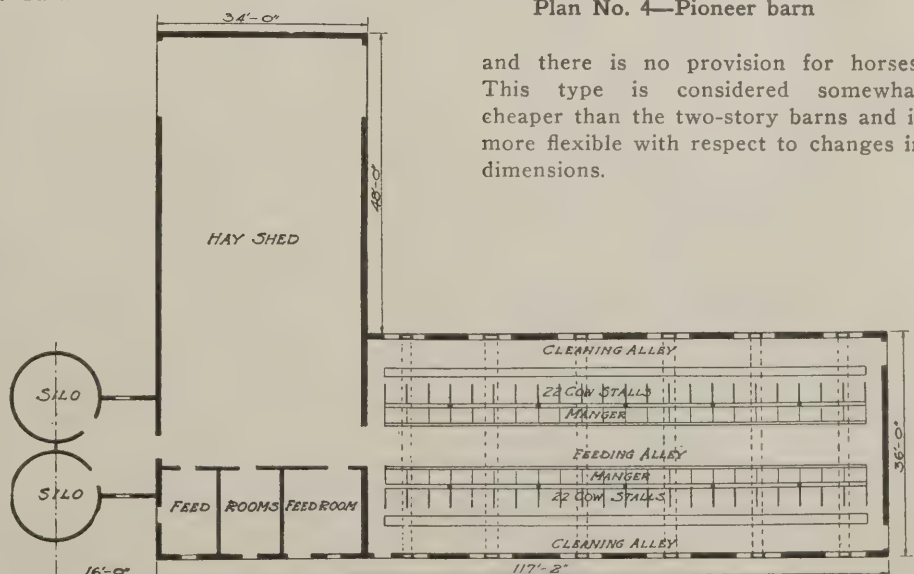
Plan No. 5 is a one-story dairy barn with the hay shed and feed room placed on the north side. The cows face in



Plan No. 4—Pioneer barn

the pioneer barn enclose only 10 cents. Bills of materials are included with the plans. The low price of these plans should not be considered an index to their worth. The plans have been carefully worked out by experienced men and have found favor with the many builder and farmers who have employed them.

Plan No. 1 is a general purpose barn for a large farm. The cows face in, and the silo is placed at the end of the central feeding alley. The feed room and silage room are combined and a root cellar is provided just below the feed room. The horse barn is separated from the cow barn by sliding doors. The barn loft is divided into six bents of 14 feet each. Hay is elevated into the loft from the outside and feed bins are provided on this floor.



Plan No. 5—Dairy barn

and there is no provision for horses. This type is considered somewhat cheaper than the two-story barns and is more flexible with respect to changes in dimensions.

Measurement of Masonry

Among the important rules for the measurement of masonry adopted by architects, builders and engineers, are the following:

Excavations of Cellars and Basements

1. Excavation to be measured and computed by the actual amount of material displaced. If unit price is based upon loose measurement add forty (40) per cent to actual bank measurement, except if consisting of sand and gravel, when only twenty (20%) will be added. If rehandling becomes necessary, same to be done at a special price agreed upon in addition to the above.

Excavation of Trenches and Pits

2. Excavation of trenches, pier holes, or pits when more than 3 feet wide to be computed on actual contents when less than five (5) feet deep.

When less than three feet wide excavation of trenches, pier holes, or pits to be computed on actual contents if less than two (2) feet deep.

If more than two (2) feet deep compute contents of trench on base of three (3) foot width, even though same is narrower.

If less than two (2) feet in depth estimate actual width.

For pits or pier holes more than two (2) feet deep and less than twelve (12) square feet in area estimate area of same on base of twelve (12) square feet multiple by depth of same down to five (5) foot, and if more than five (5) feet deep estimate on same basis as given below for additional depth of trenches, with the same percentage of increase added.

Add 75% of actual contents of excavation of trenches, pier holes, or pits for depth between five (5) feet to ten (10) feet.

Add 150% to actual contents of excavation of trenches, pier holes, or pits, for depth between ten (10) feet and fifteen (15) feet.

Add 225% to actual contents of excavation of trenches, pier holes, or pits, for depth between fifteen (15) feet and twenty (20) feet.

Add 300% to actual contents of excavation of trenches, pier holes, or pits, for depth between twenty (20) feet and twenty-five (25) feet.

Add 375% to actual contents of excavation of trenches, pier holes, or pits, between twenty-five (25) feet and thirty (30) feet in depth.

Add 450% to actual contents of excavation of trenches, pier holes, or pits, between thirty (30) feet and thirty-five (35) feet in depth.

Back Filling and Grading

3. Soil required for back filling or grading to be measured by computing from cross-sectioning cubic contents of area to be filled or graded.

Shoring of Earth Banks

5. Shoring of earth banks to be done at unit price, per square foot of shored surface of bank.

Draining

5. Pumping or bailing when required to be done at special price, in addition to excavation unit price, as the excavation rules are based on dry work; this however, does not apply to rain or storm water.

Concrete Foundation

6. Foundations for walls to be measured actual contents when made with square and level off-sets.

Footings with sloping or beveled off-sets less than 30% from the horizontal multiply area of base by greatest height of footing. This applies to piers also, except when courses in pier foundations are less than twelve (12) feet in area, when one (1) cubic foot will be added for each corner for every foot in height of such course.

7. Foundations for all projections such as

chimney breasts, pilasters, buttresses, or flues connected with walls to be measured actual contents contained therein, and one cubic foot added thereto for each corner for every foot in height.

8. Recesses and slots in foundations to be measured solid and in addition thereto allow two (2) cubic feet for every foot in height or length.

9. Arches in foundations. Multiply length of chord at spring of arch by height from chord to extrados by thickness of arch, and add to the wall measurement. Height of arch ring equal to thickness of wall.

Circular or Polygon Foundations

10. Circular or polygon foundations to be figured at double actual contents.

External, Division and Interior Concrete Walls

11. For walls fourteen (14) feet or less in height, twenty-four (24) inches or more in thickness, use the actual thickness as basis in computing the volume. For walls less than twenty-four (24) inches in thickness, add one-half the difference between the actual thickness and twenty-four (24) inches in computing the volume. If walls are more than fourteen (14) feet in height between floors add to cubic contents fifteen (15) per cent for every additional four (4) feet in height, on accumulative scale, as given for trench excavation.

Battered Walls

13. For battered, or sloping walls estimate contents on same basis as for external and division walls and add one-half ($\frac{1}{2}$) of contents of wedge or batter to same when narrower on top than twenty-four (24) inches. See Paragraphs 11 and 15.

Hollow Walls

14. Hollow walls to be at special rates.

Corners

15. For each corner of wall more or less than ninety (90) degrees add one foot six inches (1'-6") to girt length of walls in measuring.

The term corner is used for salient angles of walls, and angle for re-entering angles.

Piers

16. Independent plain square piers to be measured by the same rule, i. e. add one cubic

foot for each corner for every foot in height. For plain polygon or round piers add four (4) cubic feet for each foot in height.

Recesses

17. Recesses and slots to be measured solid and in addition thereto allow two (2) cubic feet for every foot in height or length.

18. Every superficial foot of "one-half brick (or 4-inch wall)" to be estimated at seven and one-half bricks; of "one brick (or 8-inch wall)" at fifteen bricks; of "one and one-half brick (or 12-inch wall)" at twenty-two and one-half bricks; of "two brick (or 16-inch wall)" at thirty bricks, etc.—increase the number of brick by seven and one-half for every additional half-brick in thickness of wall.

It is not safe to lay brick at less than 20 degrees above zero; brick laid in cement at less than 25 degrees above zero.

Openings With Frames Built In

19. Deduct contents of windows, doors and other openings, measuring from jamb to jamb and from top of sill to spring of arch, and add two (2) feet of wall for each jamb for every foot in height of opening when plank frames are used; if box frames are used add four (4) feet of wall for each jamb for every foot in height.

Openings Without Frames

20. Deduct contents of openings, same to be measured from top of sill to spring of arch and shortest distance between concrete jambs for width, and add for each jamb two (2) feet of wall for every foot in height of opening.

Circular, oval or other special shape openings to be figured at special price.

Chimney Breasts, Flues and Pilasters

21. All flues and hollows in chimneys or walls less than two (2) feet in area figure solid and add two (2) cubic feet for every foot in height. All flues and hollows in chimneys or walls from two (2) feet to four (4) feet in area to be measured solid. When larger deduct one-half ($\frac{1}{2}$) of contents of flue.

Detached portions of chimneys in buildings and plain chimney tops above roof to be measured solid, and one (1) cubic foot to be added for each corner for every foot in height.

Trimming

22. No deductions allowed for omissions of concrete for cut-stone, terra cotta or other trimmings, bond blocks, timber, joists or lintels.

All ornamental or moulder work in cornices, gutters, belt or sill courses, etc., to be figured at special rates.

Cutting and Patching

23. Cutting and patching of joists, girder, or hotel holes, slots, panels, recesses, etc., to be paid for on basis of time and material required.

Concrete Floors on Soil and Tile Archers

24. Floors to be measured by the superficial surface between outside walls of building. No deductions to be made for floor sleepers, conduits, pipes, drains, division or partition walls. No deduction to be made for any piers, columns, chimney breasts, pilasters or other projections of walls of ten (10) feet or less in area.

Girders, Floor Beams or Other Drop Projections Below Floor Slab

25. For projections named in this paragraph add for each corner and angle to cubic contents one (1) cubic foot for each foot in length. For each chamfered or rounded corner or angle add

Don't try to fight your building or business troubles alone! Others having experiences the same as yours have told how they overcame them. It is by open conferences that the tables here given have been prepared. Send in your problems to National Builder. Someone will answer and you and other builders will be helped.

one-half ($\frac{1}{2}$) cubic foot for each foot in length in addition to the above.

Floor Slabs

26. Floor and roof slabs to be estimated on same basis as called for in Paragraph 24 for floors on soil, and at a minimum thickness of six (6) inches. Less than six (6) inches in thickness will be computed as six (6) inches.

Openings

27. No deductions to be made in floor area for openings of less than twenty (20) square feet. For larger openings after deducting full area of opening, add one (1) superficial foot to floor area for each foot in length of girt of opening, and one (1) cubic foot extra for each corner or angle.

Depressions

28. For pits, baskets or other depressions in floor, add one superficial foot to the area of walls and floors of same for each foot in length of each corner and angle.

Setting of Facias, Frames, Pipes, Sleeves, Bolts, Rods, Clamps, Etc.

29. Setting of facias, frames, pipes, sleeves, bolts, rods, clamps, etc., imbedded in concrete, to be paid for additional at special price.

Floor Base and Coves

30. Floor base and coves to be estimated at special price per lineal foot with one foot added to length of same for each corner and angle. For base or cove around round columns estimate three (3) times girt of column and for square or polygon columns add one foot for each corner to girt of same.

31. Concrete stairs to be estimated square foot area of face of treads and risers. Stair-landings and platforms between floors to be same unit price per foot as stairs.

32. Curbs and roofs of skylights to be estimated on same basis as called for in sections 25 and 26 except that quantities for same shall be doubled.

33. Sidewalks laid on soil or tile and brick-arches to be estimated same as floor-slab section 29 with special unit price.

34. Sidewalks reinforced to be estimated same as called for in sections 25 and 26 with special unit price.

Curbs to be estimated per lineal foot at special unit price.

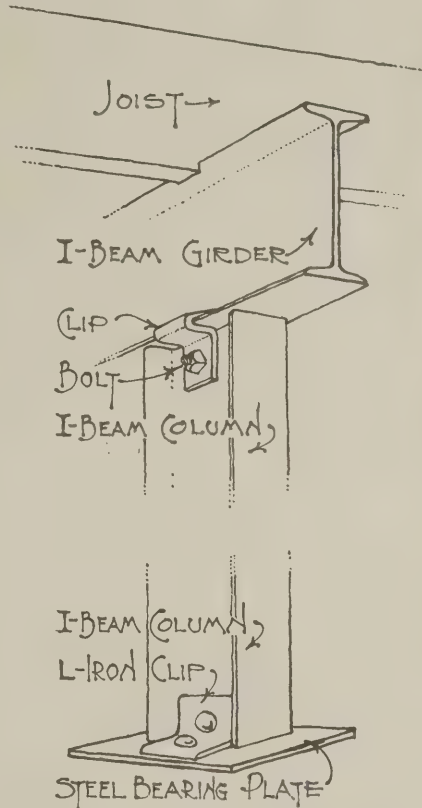
Driveways to be estimated square foot area at special unit price.

Structural Steel for Supports

In some localities it is cheaper to use steel supporting members in the basement than to use the usual wooden or masonry ones. The objection to the use

danger from fire is remote there should be no doubt in using the steel supports.

The photograph shows the steel column set, ready for the concrete footing



to be poured. The sketches indicate the manner of framing the steel. It would be an improvement if the floor joists were notched slightly over the girder to prevent it from deflecting sideways. The joists should be bridged just above the girder.

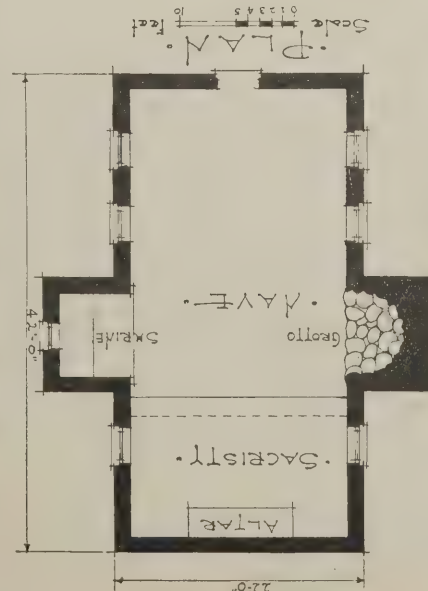
AN INTERESTING SMALL CHAPEL

An interesting chapel is that of Our Lady of Lourdes which is located in a Chicago parish. The stone grotto was suggested by the famous French shrine and grotto which bears the same name.



The materials were donated, and practically all of the construction work was done by the Benedictine Fathers of the parish who were also the designers.

The interior has a barrel-vault ceil-



ing of plaster which is decorated with fresco work in bright colors. A stream of water trickles among the stones of the grotto giving a realistic effect.

The tower dome is of copper and a



statue crowns it. Behind the corner ornaments are flood lights which are used with striking effect to illuminate the statue at night.

New Methods in Construction

By L. M. Edholm

SOME radical changes in concrete construction have been developed which cuts down the cost of building in concrete materially. This system is the use

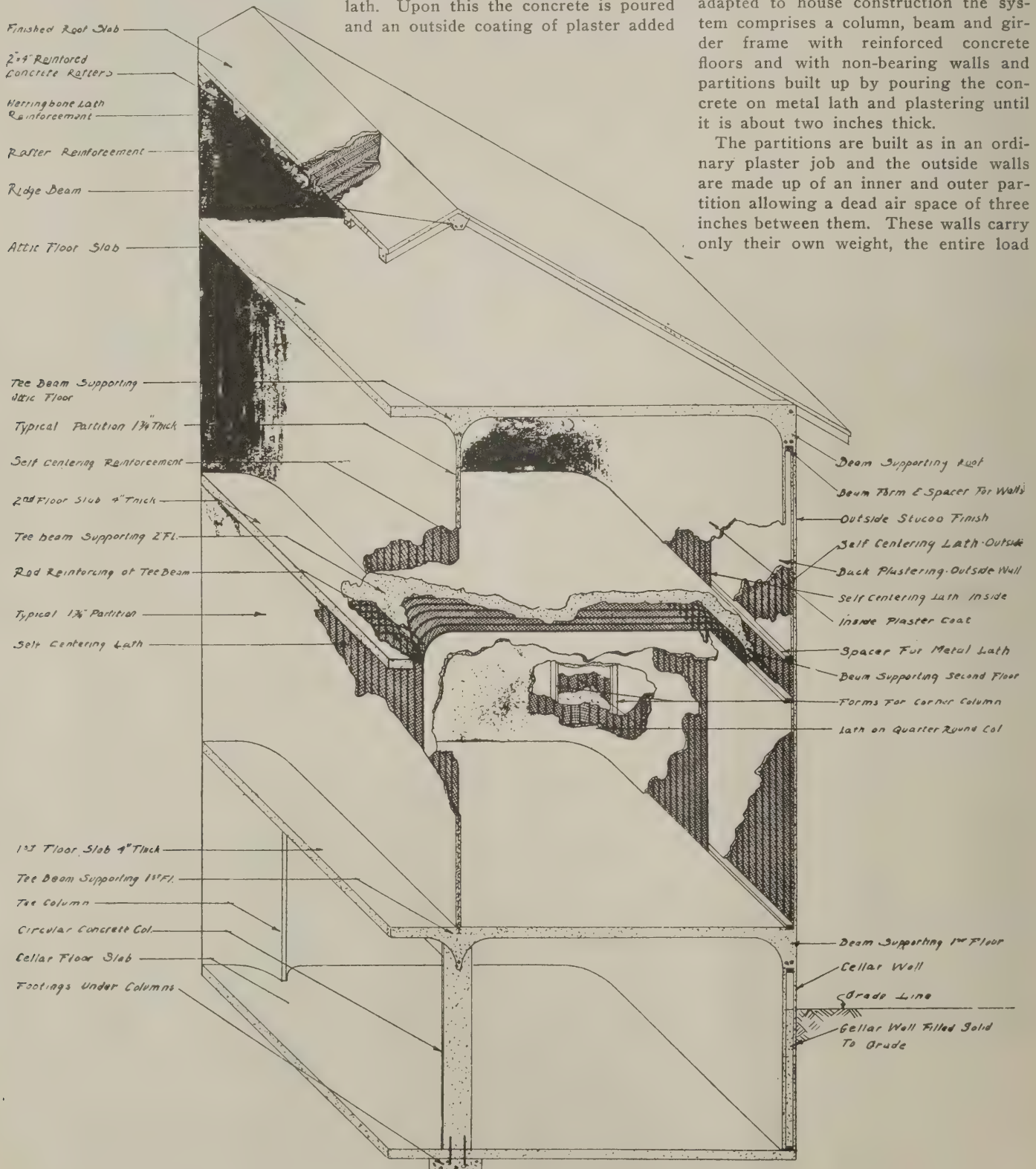
of metal lath reinforcements in place of forms.

The frame of the structure, whether for small houses or large, is of metal lath. Upon this the concrete is poured and an outside coating of plaster added

for finish. The lath constitutes the reinforcement.

A number of unusual details in construction are interesting to note. As adapted to house construction the system comprises a column, beam and girder frame with reinforced concrete floors and with non-bearing walls and partitions built up by pouring the concrete on metal lath and plastering until it is about two inches thick.

The partitions are built as in an ordinary plaster job and the outside walls are made up of an inner and outer partition allowing a dead air space of three inches between them. These walls carry only their own weight, the entire load



of the building being sustained on columns and beams. This type of wall has been proven by repeated tests to be admirable for fire resistance. The air space keeps the interior of the building from being damp, often a cause of complaint in some buildings.

A peculiarity of the system is the bending of the metal lath sheets to form the column and beam sections. In the basement where there are no partitions the columns are round, but above the first floor the columns are formed by bending the lath for the partitions and the inner wall at the corners of the room to form a triangle. Inside of this the concrete is poured, making a solid column. The metal lath sheets which form the floors are curved down in the same manner toward the partitions, forming a triangular space extending the four sides of the room. The lath is bent at the corners with about a twelve-inch radius and secured at the ends. The concrete is then poured to a thickness of from three to three and one-half inches on the floor and is poured down into the triangular space forming a solid concrete

beam around the rooms and merging into the triangular column at the corners. The floor lath is held in place by

temporary shores placed about three feet apart until the slab is poured and the concrete set. The rib of the lath

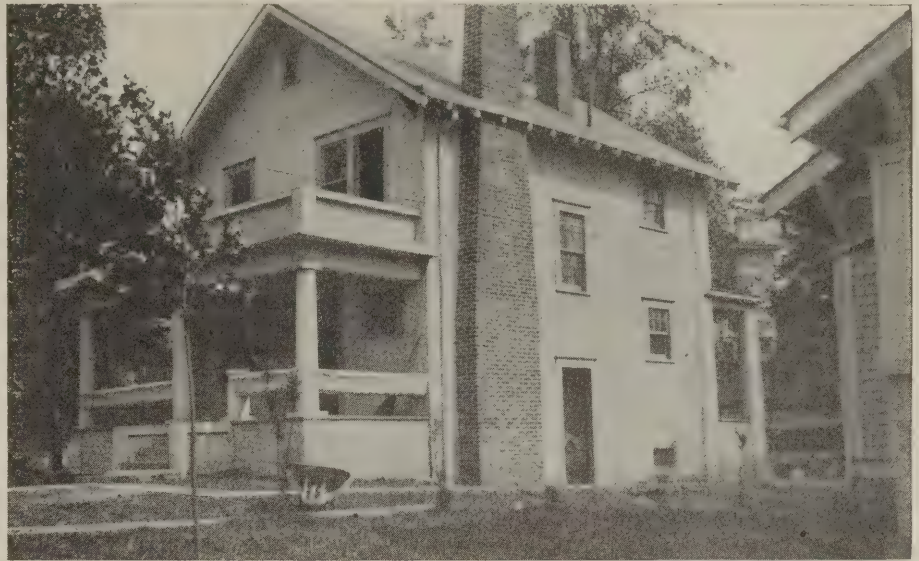


Plate 1—Front and side of finished house. Note gutter on roof and exposed rafter ends



Plate 2

Plate 2—The columns are poured and show the concrete through the mesh. The rib in the lath shows in black vertical lines. Floor lath is erected for second floor, and shows where beams will intersect with columns. Also shows inside lath

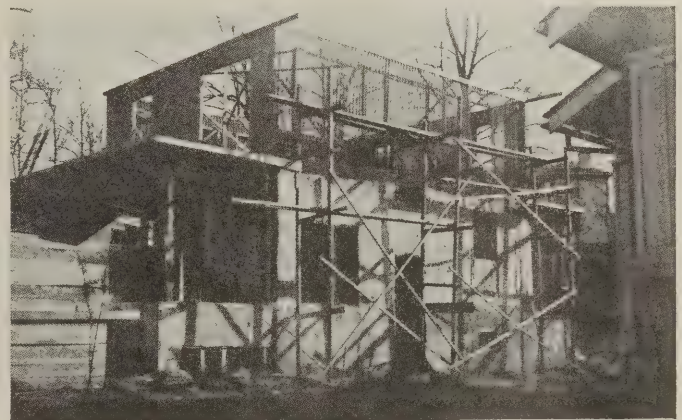


Plate 3

on outside wall with 3-inch space between inner and outer wall. Plate 3—Erection of outside lath for the second story with first story and basement walls rough scratched with cement mortar. Porch columns and roof slab for porch is poured.



Plate 4

Plate 4—Interior of outside wall for second story brick plastered and ready to erect lath for inside finish leaving a 3-inch dead air space between inner and outside wall. The columns are poured; note rough band at top of wall where beam goes



Plate 5

when the ceiling lath is erected. Plate 5—Metal lath in place with conduits for electric wires. Planks on which to wheel concrete for pouring the second floor slab and beams.

gives sufficient stiffness to allow the concrete to be poured directly on the lath.

Even the stairs are made in a solid block, reinforced with the lath and built without forms.

The ceilings throughout the entire house are coved, usually on an arch of about ten or twelve inch radius. This cove ceiling hides the beams and adds to the beauty of the room. The corners of the rooms are also curved, which leaves no seam or crack to collect dust.

The design shown in the photograph is one that has heretofore never been built

in any other building material except wood.

Such details as the round, tapered porch columns, the curved flower boxes, the front steps with panel sides, the panel rail for upper porch, the verge boards supported by brackets, and exposed rafter ends, are of interest when it is realized that all these are of concrete built without forms or moulds. The roof is a reinforced slab of concrete made with the metal lath while the Yankee gutter is integral with the roof slab. The chimney was built of

brick merely for contrast; it might just as well have been constructed in the same manner as the rest of the building. Porch, floor and roof is colored to suit by mixing the color with the concrete itself.

These revolutionary ideas in concrete construction are the creation of C. W. Donaldson, of Pittsburgh, who is now working on a large building to test whether this system of construction is adapted to office buildings, hospitals, etc., where fire-proof construction is required.

American Timber Architecture

AN indiscriminating condemnation of American timber architecture comes from Stockholm, Sweden, by way of Bassett Digby, correspondent of the Chicago Daily News, who says that C. J. Engstrom, of the editorial staff of Svenska Dagbladet, of Stockholm, and a recent visitor to America, declares that

This rather touches our national pride, but trying to see through Herr Engstrom's eyes as well as our own we think he has not looked deeply enough. All that is in America is not American. Here is an old-time American building of the middle west, photographed a few weeks ago. It was built when there were

ican—the "abominable sheds" are either imported taste or the creation of the cheap speculator that belongs to every country. This building is not uncommon. It is American in its simplicity and directness and its good lines, and one of the kind that the women say "has possibilities" and fix up as they only



what least favorably impressed him in this country was the timber architecture.

"Decidedly the most repulsive thing that met my eyes in America," says Herr Engstrom, and Mr. Digby says he quotes Mr. Engstrom's own English phrasing, "was the timber architecture in town and country. The Yankees can build in stone, iron and brick with a monumental beauty and taste perhaps superior to those of other nations. But their wooden buildings are abominable sheds. An American writer has recommended the wooden country house of Sweden as a good pattern for his compatriots, and the advice ought to be followed."

no building laws, liens, or bonds—when the man who wanted a house shouldered his trusty axe and chopped the trees down and built without frills. It is one of those timber buildings that are Amer-

The July National Builder will be a "Home and Housing" issue. Send in your plans, Mr. Builder, along with the rest. Don't hide your ideas. Bring them out and air them.

know how to do into all the beauty that the lapidary gives the rough diamond.

But to remove all excuses for bad design and bad planning the architects of America are bestirring themselves in a most patriotic way. The American Institute of Architects has appointed a committee to develop plans for small dwellings and the members of the Minneapolis Chapter have developed a scheme by which they can furnish to the man of moderate means plans and specifications of good design and economical planning at moderate cost. This patriotic example will, it is hoped, extend to architects throughout the country.

A Practical Two-Family Bungalow

By Charles Alma Byers

AS a home-building idea to meet present conditions, the two-family house is deserving of especial consideration. Enabling the building, at slight additional cost, of two homes on ground space that ordinarily is utilized for but one, it, in the first place, is the embodiment of economy. Secondly, the house of this kind may be made, even at the prevailing increased cost of materials and labor, to constitute a safely lucrative investment. It means that, as compared with the ordinary single-family

hood environment, however, it may be, and should be, made to possess an attractive exterior. Its interior should also be comfortably and conveniently planned and finished in pleasing style.

Representing in style of architecture the typical California bungalow, the little house here shown illustrates the "duplex" idea. With a center partition running from front to rear that divides it into two apartments of equal size and identical arrangement, the interior is well-planned, particularly in respect to

The interior woodwork consists of pine throughout, which in the living rooms and dining rooms is stained to resemble fumed oak, and elsewhere is enameled white. The walls of the living rooms, dining rooms and bed rooms are papered, and those of the kitchens and bath rooms are finished with a hard-finish plaster coat and enameled like the woodwork. Hardwood floors prevail in the living rooms and dining rooms.

The house has a separate basement, walled and floored with concrete, for



A two-family bungalow—E. W. Stillwell, architect

house, that the owner receives on his investment double, or nearly double, the usual income.

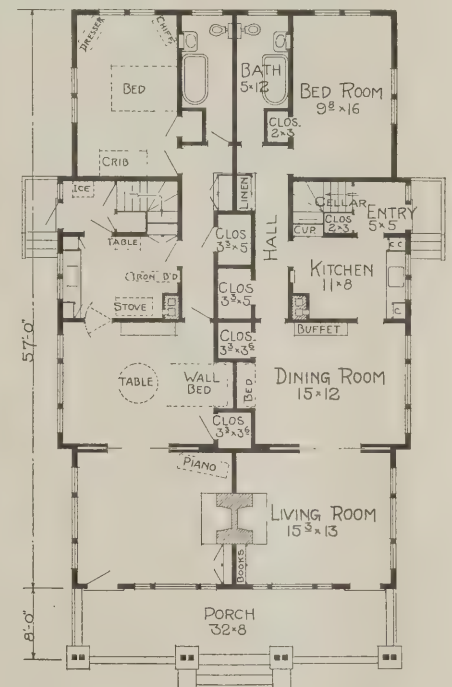
The two-family house, however, need not always be regarded as a direct income-yielding proposition. Frequently, in fact—and this comprises one of its particularly interesting possibilities—one-half of the house so designed will be occupied by the owner himself, leaving the remaining half for rental purposes. In such cases, the rented portion not infrequently will yield revenue sufficient to constitute a reasonable rate of interest on the entire investment, and hence the builder and owner has a home for himself that virtually costs him nothing. Such a plan often proves practical and desirable as a temporary arrangement, at least.

The designing of the two-family or "duplex" house deserves to be given rather careful study. In size, style and cost it must be more or less governed by the character of the neighborhood in which it is located, particularly with reference to prevailing rental values. Quite regardless of this matter of neighbor-

hood features; and, with the front characterized by two separate entrances, the exterior is attractive and well-balanced.

The outside walls of the house are of alternate wide and narrow siding, over sheathing; the roof is covered with an asbestos-like composition, and the masonry of the front porches consists of gray-toned artificial stone, while the flooring is of cement. The walls are painted a light French gray shade, and the trimming is done in white.

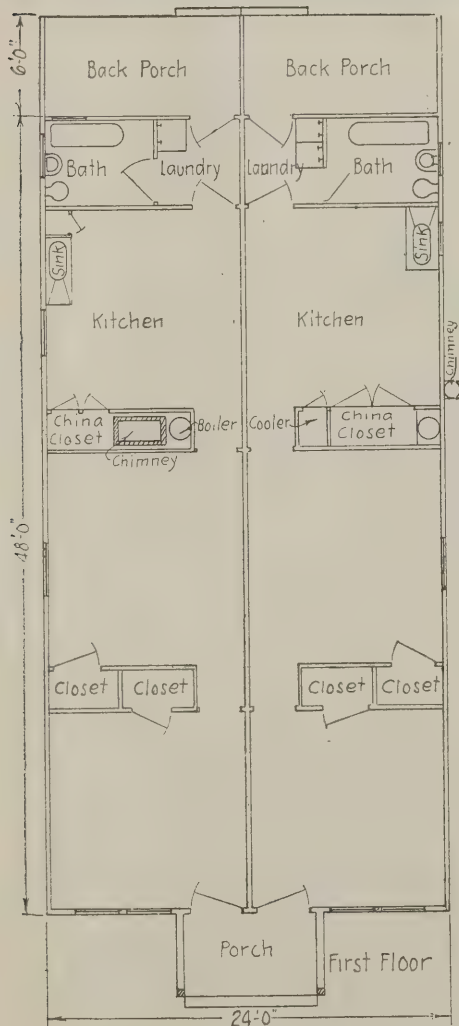
The rooms of each division are living room, dining room, kitchen, bath room, and one bed room. Each living room contains a built-in book-case at one side of the brick fireplace; the dining room a built-in buffet, or side-board combination, a wall-bed and a closet; the kitchen an ironing-board cabinet, a draught cooler-closet and the other usual features; the bath room a small medicine-case; the bed room a clothes closet, and the hall both a closet for wraps and a cabinet of linen drawers, while on the rear entry porch is a small storage closet, besides the stairway to the basement.



each division, which occupies the space covered by the dining rooms and kitchens. There is also a furnace for each division.

This two-family bungalow is located in Los Angeles, California, and was designed by E. W. Stillwell, of that city. It is estimated to cost on an average of about \$4,000, complete, at the present time.

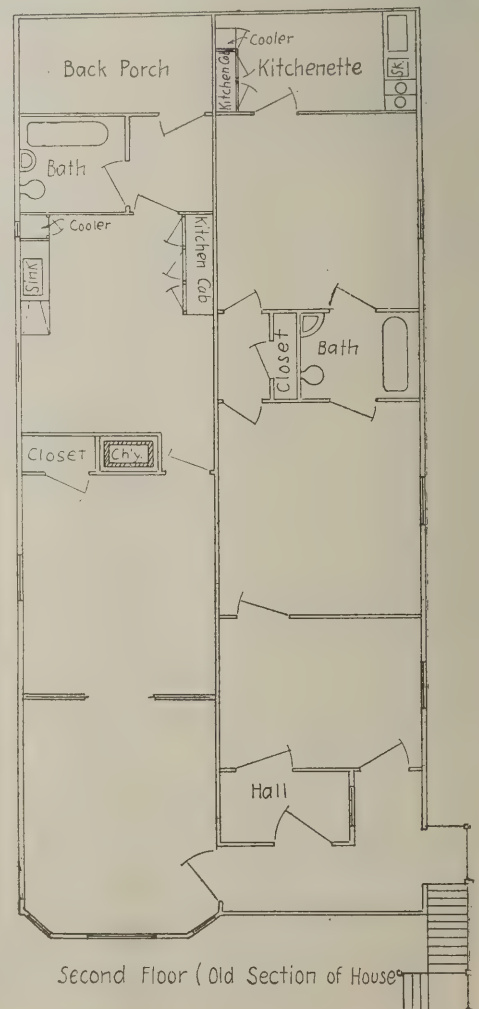
The building lot required for two-family houses of the kind here shown, as will be realized by referring to the accompanying floor plan, need not be of more than ordinary width. In fact, a fifty-foot lot will readily accommodate this plan, and leave room for an automobile driveway. Incidentally, the back garden space of the lot thus employed is usually divided into two equal halves, like the house itself, with a low partitioning fence, so that each family may have its own individual garden plot.



Remodeling the old building shown on the left to the condition shown on the right and in the plans herewith changed its earning power from \$25 a month to \$75 a month.

The remodeling cost \$3,000. Considering the advantages of the locality described in the article the question arises: Would it not have paid proportionately well to have rebuilt entirely?

When to rebuild and when to remodel is a much disputed question. What are your experiences? See the full description on the next page.



How Remodeling Paid

By Florence Wieben

INCREASING the rent from twenty-five dollars a month to seventy-one is what the owner of the cottage pictured here has done within two months' time. All he had to begin with was a twenty-year-old five-room house on a lot 37½ feet by 130 feet, in an old but very convenient residential neighborhood.

The property was purchased for twenty-five hundred dollars in 1918. At first the new comer felt satisfied that twenty-five dollars was all he could expect from such a place, although he realized that it would mean a mighty long wait before it would pay for itself, with taxes and upkeep also to consider. Then the idea that will bring him exactly forty-six

dollars additional rent each month occurred to him. He set to work.

After the house was raised it was subdivided into four separate apartments with modern conveniences, each consisting of three rooms and bath, with private front and rear entrance. Naturally, the arrangements are not the very best due, of course, to the handicaps always encountered in remodeling an old building. But apparently they are not objectionable, since all four apartments have been spoken for in advance.

The north side apartments, receiving little sun, will rent as follows: Lower, sixteen dollars; upper, seventeen. Those

with southern exposure: Lower, eighteen; upper, twenty. (See plans illustrating why different rents are charged.) A garage will be constructed in the rear and a driveway made on the side of the house.

The total cost of remodeling, including the garage, amounted to \$3,000. In a little less than six years and a half, providing all apartments are occupied continuously, the \$5,500 invested will have found their way back to the owner. Had he been content merely to leave the place as it was bought, renting it for twenty-five a month, it would have taken eight years and four months before the building became a paying proposition.



A GARAGE SUGGESTION FOR TERRACED GROUNDS

This idea for a Garage on terraced grounds comes from California. The Garage is located in the front garden and has been tunneled in the hillside on a level with the street. The walls are built of cobblestones, which are plentiful in the neighborhood.

Men and Machines

From the United States Department of Labor comes the information that an extraordinary tide of emigration from this country is setting out. In some cities the movement amounts to 50 per cent of the population of the foreign born

AN increasing reliance must be placed on machinery in the future to replace man-power. It is in this field that America has won its way in the industries. These facts have peculiar interest to the builder. Some of the recent accomplishments by the intelligent use of machinery are unparalleled.

Among these the world's record is claimed for the work of erecting a forty-bed hospital in ten hours and thirty-eight minutes. The building is an addition

to the hospital establishment of General Hospital No. 10, known as the Fox Hills clearing hospital, at Staten Island, N. Y.

One-Story Frame Structure

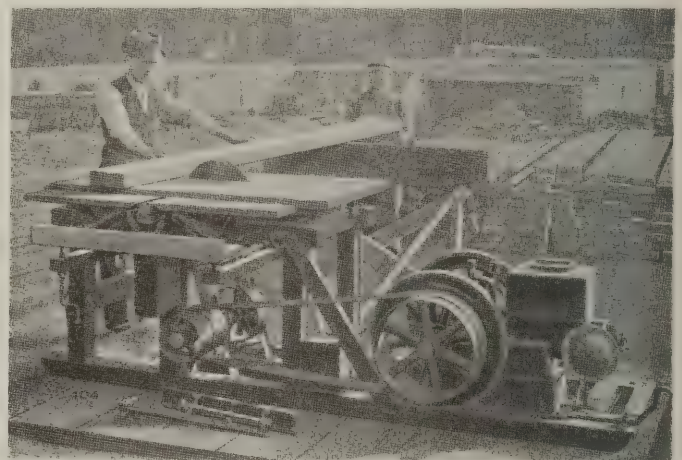
The building is a one-story frame structure with a convalescing porch, and has in addition to the ward a diet kitchen, surgical dressing room, linen room, bath, and ward officers' toilets. It is 156 feet long by 24 feet wide. The porch is

10½ feet wide and runs the length of one side of the building.

When work was begun at 7 o'clock in the morning not a posthole had been dug and no other preparations were made beyond that which is always done before work begins on a building. The four corner posts only had been set to indicate the extreme dimensions of the building. Considerable of the lumber for use on the building was on the spot, but none was cut to size, and all trimming and



Four men working at once—ripping, planing, boring and scroll sawing



Portable machines "on the job" make quick work, accurate work, and save the energy of the men



A hospital built in ten hours and thirty-eight minutes

cutting was done while the work was in progress. Even the foundation posts had to be lined up by instruments and sawed to the proper length.

Postholes Dug in Eight Minutes

Promptly at 7 o'clock 130 laborers under two foremen began to dig the postholes. This work was finished in eight minutes. During the next hour 434 men, carpenters, plumbers and electricians, were occupied on the building. As fast as the carpenters set their boards the plumbers began to set their pipes and the electricians to run their wires. During the next hour the number of workmen was increased to 450 men. Between 11 and 12 o'clock 566 men were employed. At noon the roof had been finished and

all windows had been fitted. At this time the following men were working: One carpenter superintendent, 2 general carpenter foremen, 15 carpenter foremen, 307 carpenters, 6 carpenters' labor foremen, 61 laborers, 1 plumbers' superintendent, 4 plumbers' foremen, 16 plumbers, 29 plumbers' laborers, 1 electrical superintendent, 2 electrical foremen, 22 electricians, 1 steam-fitters' superintendent, 4 steam-fitters' foremen, 30 steam-fitters, 30 steam-fitters' helpers, 1 concrete foreman, 12 concrete workers, 1 cement-finishers' foreman, 4 cement-finishers, 1 metal-lathers' foreman, 2 metal-lathers, 1 pipe coverers' foreman, 4 pipe coverers, 4 pipe coverers' helpers, 1 sheet-metal workers' foreman and 3

sheet-metal workers. From noon to 3 o'clock more than 500 men worked on the building. At 3:30 the electricians, plumbers, sheet-metal workers and pipe coverers had finished. At 4:30 only 88 carpenters remained at work, and at 5:38 the last nail was driven.

Lights Ready, Water Running

The finished building was fully wired, the lights ready to be switched on; water was running in the pipes. All the radiators had been set and hand extinguishers were hanging on the wall when the building was reported finished.

"Portable machinery on the job," experienced oversight in directing workers, cooperation all along the line! These are the secrets of building success.

Problems for Builders in England

By John R. Dunlop

INDUSTRIAL difficulties are world-wide! In England, men will be almost as scarce for a long time to come as during the war. Although many will be released from the army the demand will be so great that it will still be difficult to get the number required and the present high rate of wages is sure to be maintained.

To overcome this difficulty many masters aim to take on as many apprentices as their shops will allow, but it is difficult to get apprentices and although masters are paying them higher wages there is still a shortage.

At the present time every encouragement is being given to these young men to improve their general and technical knowledge and under the new Education Bill which will soon become law compulsory continuation classes will be established.

The future welfare of the building trade in England is ultimately bound up in educational training of its apprentices.

The good results of the old apprentice system which produced such excellent craftsmen was no doubt due largely to the interest which the master displayed towards his apprentices in those days.

Now, however, the building trade is recruited without regard to its own interest or those of the entrant with the result that the trades have become comparatively unattractive.

No lad should be encouraged to enter a trade that does not hold out hope and inspiration so that the seed of discontent will not be sown on a soil of disappointment.

Without some scheme to regulate the supply of recruits and to train them technically so that the future journeyman

shall not be continually walking on the brink of the precipice of unemployment there can be no real progress and uplifting of the trade.

Some of the keenest thinkers of the present day on the training of apprentices go back to the Craft Guilds for their ideas of how the industry of the future shall be regulated.

In bye-gone days in England every trade had its own Guild which was responsible for the standard of craftsmanship and for the training of its apprentices.

The question of commercial gain did not then occupy the first position in industry that it does today.

The Guilds had their charters under which they had considerable power of self-protection, but they also had the obligation of service to the community clearly set forth or implied.

In each Guild there were master journeymen and apprentices and all were subject to some test of fitness before they could pass from one grade to another.

In the building trade as it is at present many men in the position of employers are mere financiers and nothing more.

Firms thus constituted are the detrimental factors the trade has to contend with and many of these firms have led considerably to the failure of the old apprentice schemes in England.

Another thing which is sure to assert itself sooner or later in the building trade is that the employing class will have to be satisfied with a much less relative share of the wealth produced by industry, the operative class receiving relatively more.

There can be no other way of settling this great unrest amongst the industrial classes which proclaim for less hours

and more wage than this division of profits.

For a long time the industrial class had not got beyond the idea that the securing of higher wages was their main object.

Now they are formulating demands for much more than wages.

They are asking for a larger share of the wealth which they help to create while even some suggest a partnership between labor and capital.

All this means dearer houses for the people in England unless the production of such houses can be increased.

Previous to the war a fairly finished villa house with stone or brick fabric could be built for six pence per cubic foot.

The price today is 12 pence for the same standard of measurement. Of course material has become such an uncertain quantity that the price is bound to go up. The price of labor has also gone up 100 per cent and from my own experience I am sure that the average joiner won't hang a door in any less time than was done in my days.

We were allowed 45 minutes to fit and hang a 1½ thick pass door. My master's contract price was then nine pence (about 18 cents) and I was paid nine pence per hour—4½ cents less than my master got. Not a great margin of profit when you consider the door had to be carried from the wagon to its place and that possibly some would not complete the hanging of the door in the prescribed time.

My own opinion is that it will be most difficult to increase the production with hand labor. We may expect that something might be done to cheapen or hasten production with machined wood work.

Notes on Piling Lumber

Photos Through Courtesy U. S. Forest Service

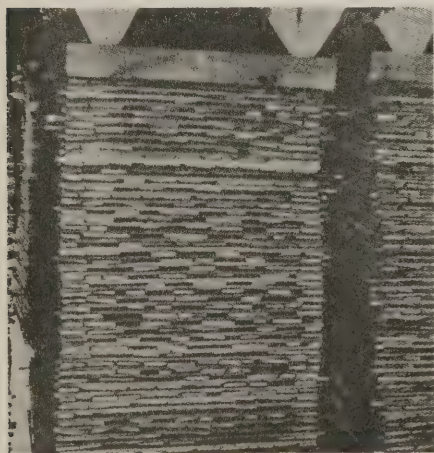
MUCH lumber is injured and in fact, rendered useless, by improper piling. Many builders buy lumber in large quantities in an attempt to reduce its cost, but by improperly piling their



Fungus growth due to failure to provide stickers

stocks they suffer losses from decayed, warped and checked lumber, that more than offset any expected saving.

Decay in lumber is caused by fungi. These are popularly known as "toadstools," "punks," etc., and are a low grade of plant life which feed upon certain substances contained in wood. Rotten wood is the result of this action by fungi and is not due to any action of the sap nor to any direct action by moisture, etc. Moisture, however, is



Cement as foundation material. The blocks extend 2 feet above and 2 feet into the ground

one of the principal factors in promoting decay, because the presence of moisture is necessary for the germination of the spores of fungi. These spores are distributed in much the same manner as are the seeds of plants. A spore float-

ing in the air finds lodgement in some crevice in a piece of lumber; lies there until conditions are favorable and then attacks the structure of the wood. If the wood is too wet or too dry, the spore will not germinate and no harm will result, but there remains the danger that conditions may at any time become favorable for its development.

Plenty of fresh air and good drainage are the most valuable agents for combating dampness, therefore the lumber piles must be arranged to give the advantage to these aids.

The first requirement will be a well drained location. The ground must be free from weeds, as they will obstruct ventilation. Debris must be removed because rotten chips, etc., often infect healthy lumber. In yards where lumber is stored for considerable periods of



Properly placed stickers and comparative absence of checks

time the ground is often surfaced with cinders, gravel, etc., to keep down the weeds. Don't use ashes as they retain moisture for long periods.

Lumber piles should be placed about four feet apart, and their foundations should be built with care. The foundations are made of timbers, called skids, resting on short posts made of wood blocks or of concrete. The skids should be parallel to each other and each skid should be level on top. They should be placed about four feet apart and the posts on which they rest should be set about four feet on centers. The bottom of the rear skid should be about one foot above the ground; the next skid about four inches higher and so on, to give a slope to the pile so that water will run off rapidly. Decayed foundation timbers are a source of much infection of lumber that is piled on them, and when discovered they should be removed and burned. Two or three coats of hot creosote would no doubt prove

of value in preventing rot in foundation timbers. For foundations that are to be permanent it would be advisable to use concrete posts. These should be about three feet square on the bottom and taper to one foot square on top. They should rest on firm soil and should be placed deep enough under ground to prevent displacement by frost.

Lumber should be piled in layers with an interval of about $\frac{3}{4}$ of an inch between the planks of each layer and a space of $\frac{7}{8}$ of an inch between layers. This separation between layers is best made by laying $\frac{7}{8} \times 1\frac{1}{2}$ strips, called stickers, across the pile between each layer. Stickers should be free from rot and should be slightly longer than the pile is wide. They should be placed directly above the skids and the ones at the front of the pile should be flush with the ends of the planks of the layer on top of them. When not in use, stickers should be neatly piled and protected from decay. Each layer of planks should project slightly beyond the layer below



Checking in white oak. No weather protection

so that water will not run down the face of the pile. The top of the pile should be protected from the weather by covering it with planks that are long enough to project a foot or so beyond the pile both at front and rear. This

cover should be made of two layers of wide, one inch planks; the top layer laid directly on the bottom one and breaking joints with it.

Random lengths of lumber should not be placed in the same stack, as the projecting ends of long pieces will surely warp. Improperly placed stickers, uncovered tops and uneven foundations are other reasons for the warping of piled lumber.

Almost all of the foregoing remarks may be applied to piling lumber in sheds. Sheds for lumber storage should be well ventilated, and this is best accomplished by allowing the lower portion of the sides to be open, stopping the siding 2 or 3 feet above the ground level. In fact, large sheds are often left entirely open.



Badly warped boards due to poor arrangement of stickers and to piling boards of unequal length together



SPEEDING UP HAND MIXING OF CONCRETE

Sometimes there is a concrete job to be put through in a hurry, the mixer is busy on more important work and hand-mixing must be resorted to. By using two mixing platforms the hand work may be rushed through.

In the photograph the men on the right proportion the materials and do the dry mixing; the men on the left add the water and do the final mixing.

It cannot be too strongly impressed on users of concrete that its qualities in making a good job depend on a careful proportioning of the sand, cement and water. The tendency is usually to neglect to thoroughly mix the sand and cement and then use too much water. The division of labor as shown here makes a special job of the measuring and a special job of mixing so that greater thoroughness is insured.

A New Brick

A new size of face brick, that has found favor among builders in St. Louis, measures four by four by eight inches.

It lays up about one-third faster than does the standard size and for some work it makes a better appearance in the wall.

The photograph shows a comparison between the new size and the standard brick. The brick on the left is the new size; the brick on the right, the standard. Likewise, the wall at the left is laid with the new brick and the wall at the right is of standard size brick.

New things are bound to be produced in greater profusion in the building trades under the pressure of the demand upon the industry. The wise builder will keep watch of these to keep up with the times.



A Community Church

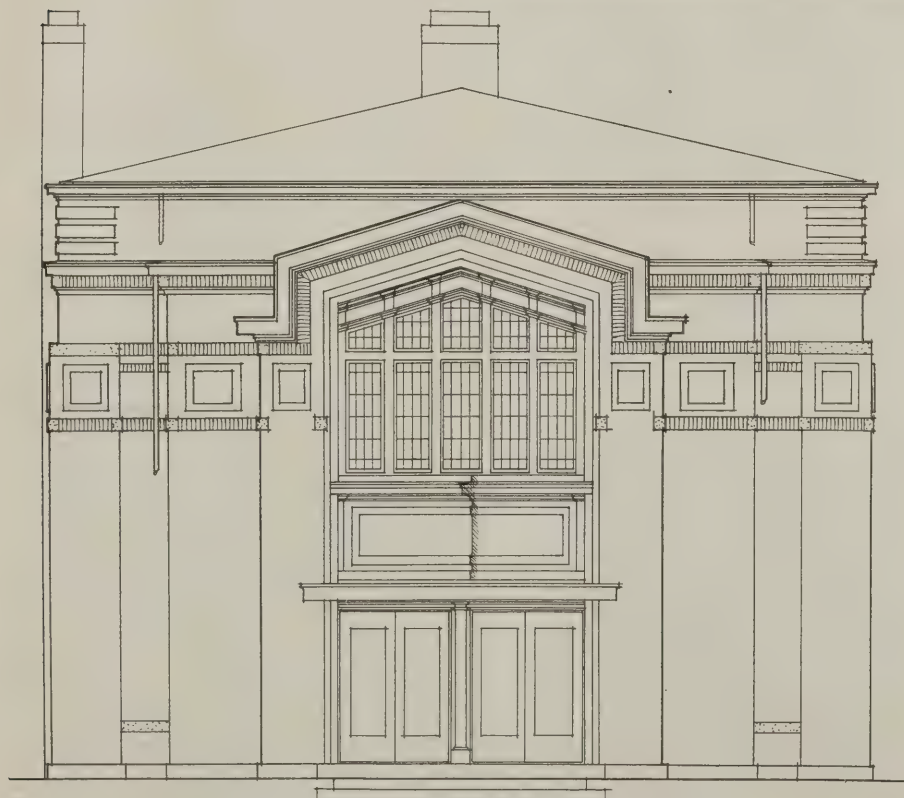
E. E. Roberts, Architect

THE community church is comparatively new. It has grown out of the necessity of utilizing all the means we have to fill larger purposes. The idea of the community church is not only to provide a sanctuary but a place where social needs may be satisfied. The susceptibilities of the spiritual idealist—the man or woman who lives in the world but thinks out of it—must be considered, as well as those of the young people intent on enjoyments and social frolics; and in addition the means of reaching out to give immediate aid to the friendless, the poor, and the sick.

The builder and the architect in designing a church of this kind must think in these terms, and of how to provide for all—and plan how best to assemble under one roof and harmonize these spiritual susceptibilities and temporal needs.

The building here illustrated is the Community Methodist Episcopal Church of Forest Park, Ill., and was designed by E. E. Roberts, architect.

The exterior treatment is very unusual—ultra-modern, it might be called. Even though all of us can't be expected



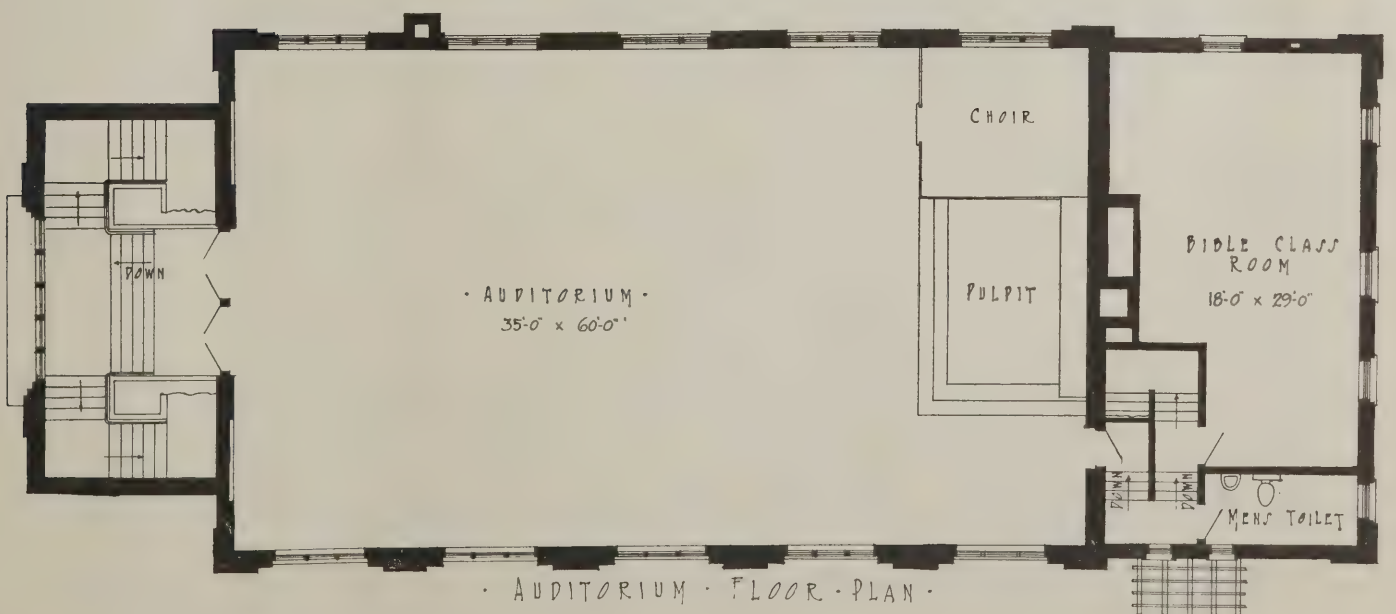
· FRONT · ELEVATION ·

to like the same things, it is unquestionably true that this style is attractive—and may be said to declare the purpose of the building, that of a community center.

The motives used in this style of design are of the simplest type. The chief reliance is placed upon grouping of masses, using plain flat members of a contrasting color to give variety to the surface. Stone, terra cotta, wood and metal are all used for this purpose.

The plan of the building offers another unusual feature that should not be overlooked. It will be noted that the Sunday school room is located with its floor about two feet below the grade line and that the auditorium is on the second floor. This arrangement conserves both ground space and money. There is no basement under the building and this is a feature that would save considerable money in a region underlaid with stone, or where surface water is to be avoided.

Incidentally, it is notable that a great increase in church building must follow the great increase in home-building, which is now giving the greatest amount of business to the building trades.



Economy in Home Building

THE small house, developed to meet war emergency needs, has become the new idea in house building. This largely because they have been well planned. They reflect the work of some of the best architects in the country who have given their experience to the designing and erection of many thousands of low-cost houses.

Economy and standardization do not mean loss of beauty or of individual attractiveness. The various showings of housing plans that are made in NATIONAL BUILDER indicate this very clearly.

A study of these houses reveals many valuable lessons, says a writer in The

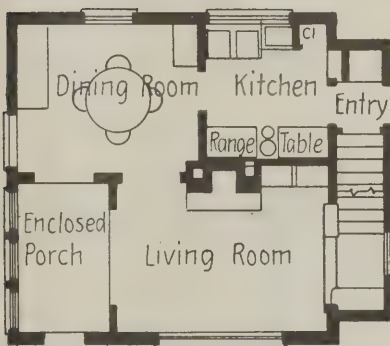
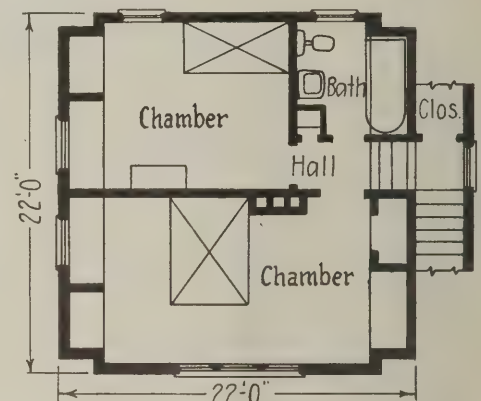
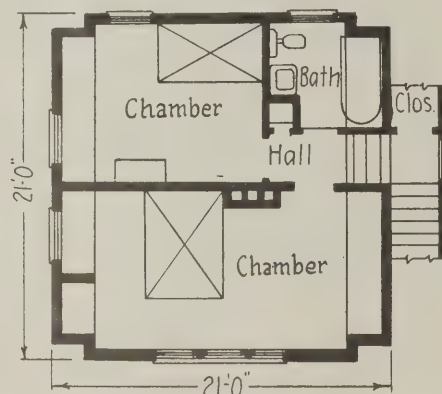
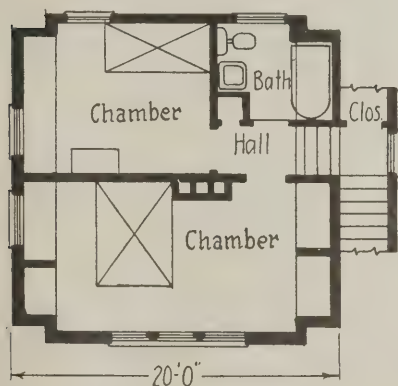
sizes in all cases where such a saving is found possible, and the utilizing of all other features of economic planning known.

To briefly summarize the more important items in the plans shown here we have a perfectly square outline except for the stairway extension, which is, for an excellent reason, placed on the outside of the basic rectangle of the building, so that it will require the absolute minimum of cubage. We have only one chimney, and that in the center of the house, requiring the least exposure to exterior view. All plumbing fixtures are concentrated so as to require only one riser line.

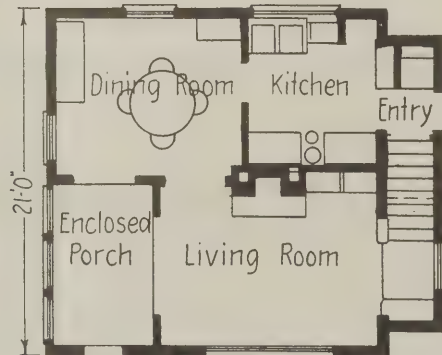
apparently increased by being so placed. The room sizes are further reduced by the careful arrangement of furniture.

All halls and passageways have been eliminated from the first story, and the second-story hall has been reduced to an exceedingly small area, but its usefulness still preserved. Cellar stairs are located so as to serve both as an inside and outside entrance to basement, and the main stairway is arranged so as to require no newels, hand-rails or balusters.

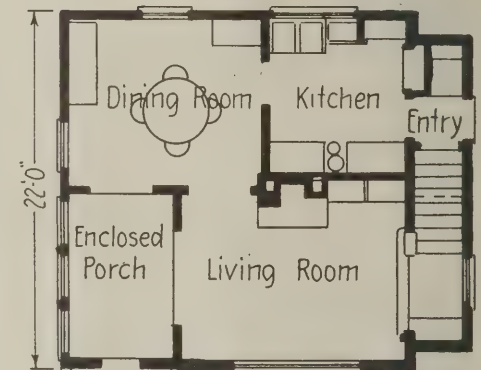
In addition to the above, in Nos. 20 and 22, the floor beams of first, second and attic stories are so laid out as to require exact commercial lengths of lum-



No. 20—Area, 460 square feet; cubage, 13,631 cubic feet; approximate cost, \$2,275.



No. 21—Area, 502 square feet; cubage, 12,513 cubic feet; approximate cost, \$2,502.



No. 22—Area, 551 square feet; cubage, 11,375 cubic feet; approximate cost, \$2,730.

Pittsburgh Leader, the chief of which is found in the startling discovery that families may be perfectly comfortable and contented in houses of much smaller dimensions than was ever before dreamed of. By this we do not mean the haphazard slicing off of room-sizes, or story-height, or the omission of rooms, closets or passage-ways, where such compartments are necessary to the comfort of the occupants; but, instead, we refer to the intelligent reduction of

The porch is placed within the boundaries of the main building, and is enclosed, so that, when so desired, its area may serve to increase the apparent sizes of both the living-room and dining-room, while in no way spoiling its usefulness as a porch. These three compartments, and also the stair-landing, are connected by liberal openings, so that no one of them is seen singly (unless the portieres are drawn together on occasion), but the size of each is

ber, obviating the usual waste of material, as well as the labor of cutting.

Now, regarding the actual money saving effected by all of these items, those who are familiar with the area and cubage figures of the average "small" dwelling, will see at once that the sizes ordinarily used have been practically cut in half. But if the little "doll house" which results is found to be perfectly livable and practical, and if we may build now in times of advanced prices a home

at the same cost as in former years, then the "juggling" of the component parts that go to make up a small dwelling which has resulted in the scheme here offered has not been in vain.

Some years ago houses of this type could have been erected at 15 cents to 18 cents per cubic foot. The frame houses built by the government during the past year have cost approximately

25 cents per cubic foot, with war-time prices and much overtime labor. In view of these facts we have based the approximate price of 20 cents per cubic foot.

Sleeping Porches

By Helen Dean Bogan

SLEEPING porches are as much a stumbling block to the builder as they are a blessing to health. They sound easy but oh! what a way they have of making a good house look lop sided and hump backed! Whether the owner wishes a sleeping porch added to a house already built, or whether he wishes a new house built with a sleeping porch incorporated, the problem is the same. And it takes a lot of hard thinking to

might be considered little things. For if it were not for that gracefully bent angle the whole house would be as stiff and ugly as a stove pipe hat.

There is one inviolable principle in building a sleeping porch for a two-storied house if one is to avoid a hump backed look. And that is that it must be over something. The ordinary choice for this foundation is a first floor porch, a sun parlor, a garage, or a porte

do toward unifying and harmonizing a house.

Fig. 4 employs the conventional sleeping porch above and sun parlor below in a clever manner. First, the angle of the sleeping porch roof duplicates the angle of the gable projections—a detail as important as it is small. Then, the sleeping porch is in the main a duplicate of the sun parlor, on a smaller scale. The architect has used the prin-



A sleeping porch wing that shows a true touch of architectural genius

produce a result in which the sleeping porch really adds to the harmony of the whole instead of looking like a tacked-on afterthought.

It is of course easier if one can build from the ground up, and give the sleeping porch a place in the original plans. Fig. 1 shows an unusual treatment, in which the sleeping porch wing becomes the architectural feature of the house. This is achieved by bending the house a little out of its true alignment, and by giving to the sleeping porch wing itself lines of great beauty. The structure is an interesting example of the preponderant importance in building of what

cochere. Fig. 2 uses both a porte cochere at the left and a sun parlor at the right. It illustrates, too, another point which is often helpful—if the pocket book and wishes of your client permit of two sleeping porches a certain balance will necessarily be forthcoming, and the builder's problem will be much simplified.

The five-sided porch over the five-sided sun parlor in Fig. 3 is good architecturally, and would make airy and spacious enclosures. But the most cursory comparison with Figs. 1 and 2 shows how much a few well chosen vines can

ciple whose artistic worth has been proved by many Colonial builders, in their smaller echo of the lines of the doorway in the second story window above.

And speaking of Colonial architecture, the Southern Colonial two-storied type of pillared porch is simply ideal for sleeping porches. The house in Fig. 5 unceremoniously discards the possibilities in the porte cochere at the side in favor of the larger field offered by the pillars at the front. And we cannot but feel that the finished product justifies the choice.



A vine covered archway with sleeping porch above



A pleasing bay windowed effect in a sleeping porch



A sleeping porch above and sun parlor beneath



Colonial houses are well adapted for sleeping porches!



A bungalow type with sun parlor and sleeping porch wings



Rebuilding an old house provides two sleeping porches



The use of pillars gives a unified look to the old house



A clever remaking of an old house

A bungalow is, generally speaking, an easy subject for sleeping porches because it can ramble about with less danger of looking lop sided. However, a bungalow which is compact and well proportioned is so much pleasanter to look at that the extra thought and study necessary for its consummation are more than repaid. The line composition of the bungalow in Fig. 6 could hardly be improved upon, so naturally do the sleeping porch and sun parlor wings follow the lines of the roof and round out the whole structure. For an inexpensive type this can be copied most advantageously.

However, it "is not always May." Builders are not always asked to build a new house with a sleeping porch. Often, very often, they are asked to add a sleeping porch to a house already built. Then it is that ingenuity is taxed almost to the point of despair. If the client is not limited as to money, and will sanction a sun parlor beneath, then the problem simplifies itself, and many of the preceding suggestions may be utilized. But if one must keep an eye on the funds the problem is harder. In some houses the slant roofed bungalow porch in Fig. 6 would be suitable. In just the right house the Colonial porch of Fig. 5 might be possible, but it would have to be used with discretion.

Almost any house, with sufficient ground, could employ a double porch or porte cochere, as in Fig. 7, with double sleeping porch above it. This is a far from expensive solution and infinitely preferable to the cheap, ungainly, protuberance at the rear which we so often use.

If, however, we must have this rear protuberance the pillared rear driveway under it offered by Fig. 8 goes a great way toward increasing its dignity.

One of the cleverest methods of incorporating a new sleeping porch in an old house is found in Fig. 9. The gabled projection may have been either cut over into a sleeping porch, or it may be a new addition, but whichever it is the result is extremely happy. It is light and well proportioned, and has an air, which so many sleeping porches lack, of really **belonging**.

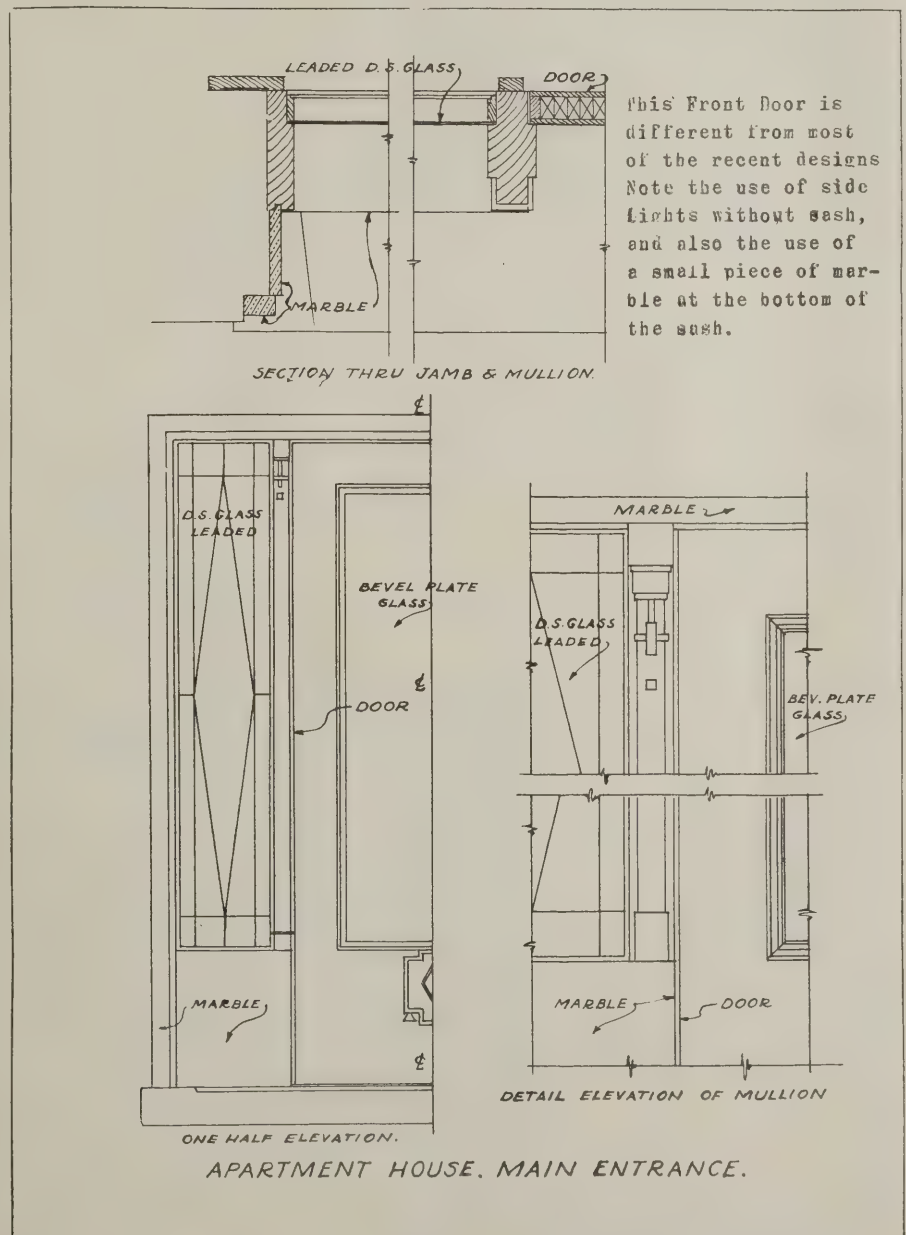
Just a word as to the technique of sleeping porch building. Whether one builds an open porch, a screened or canvassed porch, or a glassed porch, depends of course upon the purse and inclination of one's client. When possible a glassed porch is much to be preferred. Even the best of canvas or Japanese screening may not be impervious to all weathers, neither is their appearance particularly ornamental. But when the decision is fixed for a glassed porch new difficulties are faced. Before determin-

ing on the type of window to be used the size and position of the porch beds must be ascertained and measured. In general there are four kinds of windows that may be used—casement windows, windows which pull up like an ordinary room window, windows which slide sideways, and windows like street car windows, which sink into a base board.

All have their disadvantages. The point is to choose the one whose disadvantages seem smallest in any particular case. Casement windows are the easiest to operate if they will swing without hitting any part of any of the beds. This is very important. If the outdoor sleeper has to move the beds about every time an oncoming storm bids him close his windows the necessary baggage smashing will probably

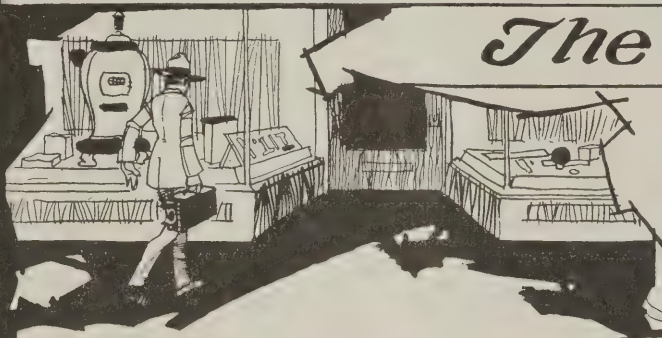
undo all the good his outdoor sleeping can do him. Where casement windows can be employed without this difficulty they have many advantages. They can be washed easily. As sleeping porch screens are seldom made detachable the outside washing of any of the other kinds of windows necessitates the removal of the window. They have also the advantage of providing a free circulation of air from top to bottom. The lack of plenty of easy circulation is a very great drawback to the use of sliding windows of the ordinary house type on a sleeping porch. It is so much harder to open them at both top and bottom that they are frequently opened only to the extent of their greatest bottom capacity and the resultant circulation is distinctly inferior.

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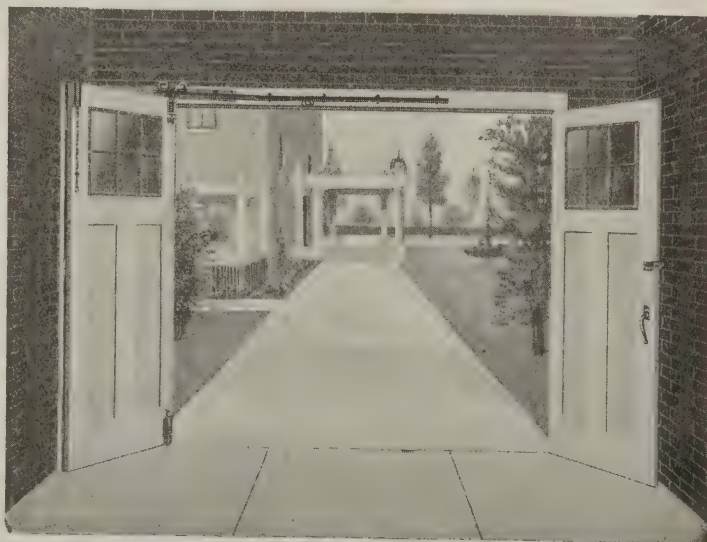
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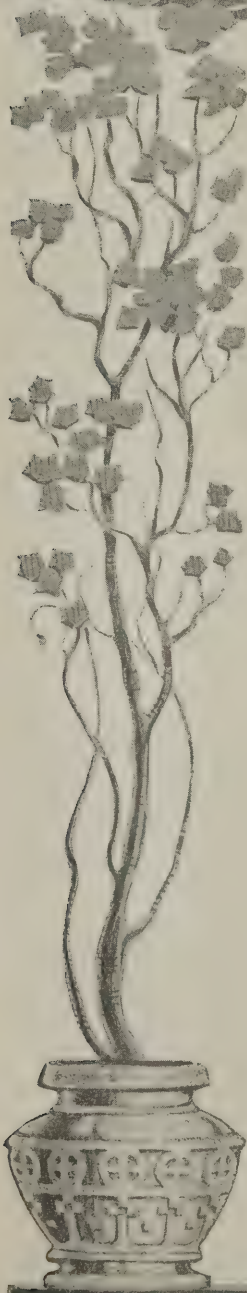
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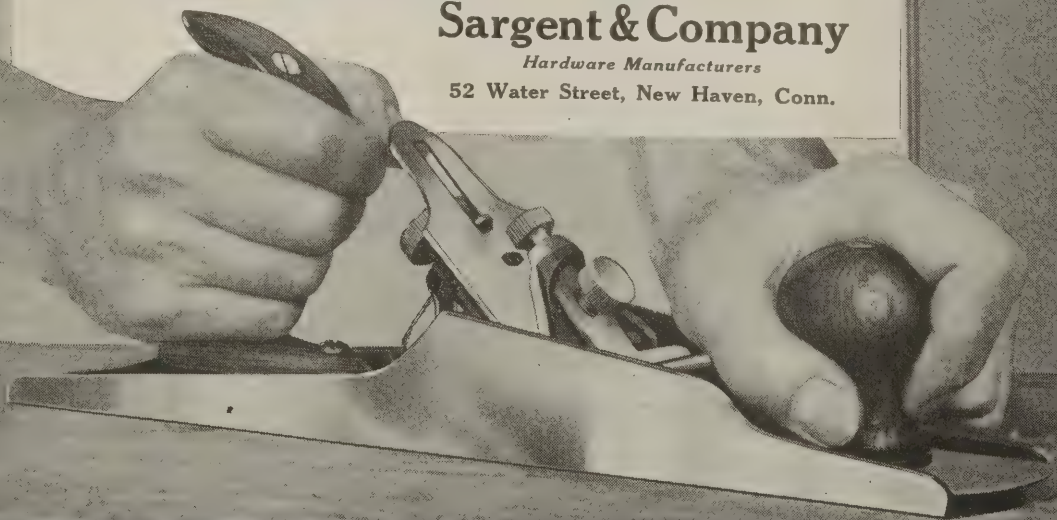
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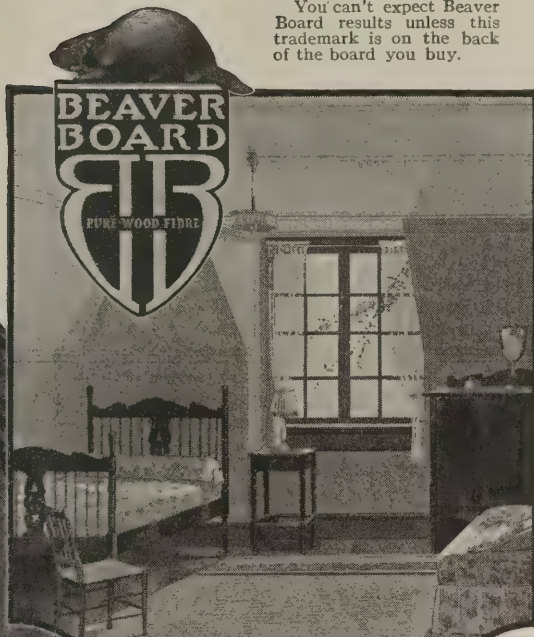


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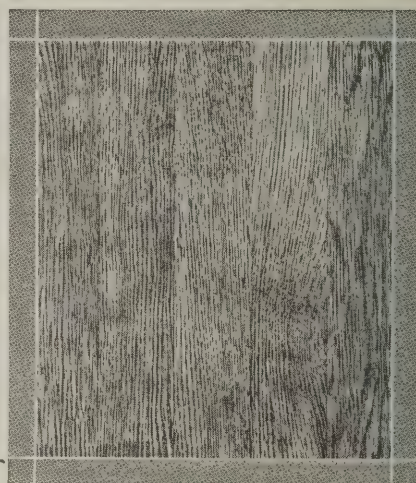
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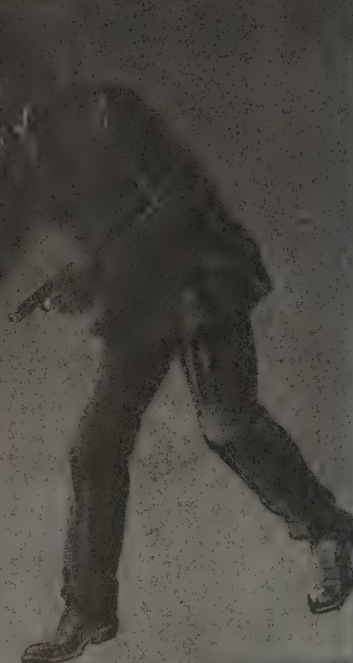
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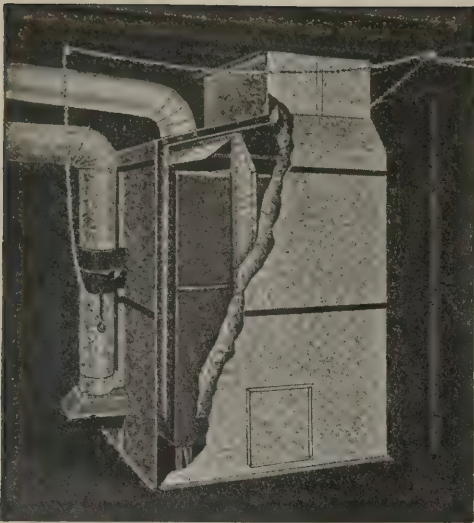
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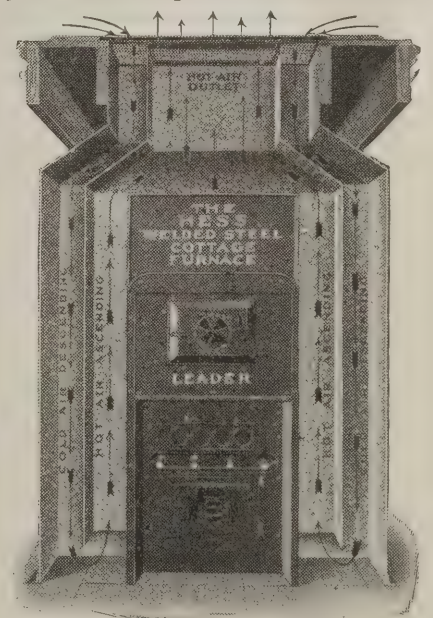
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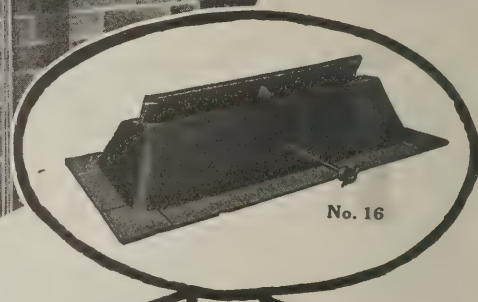
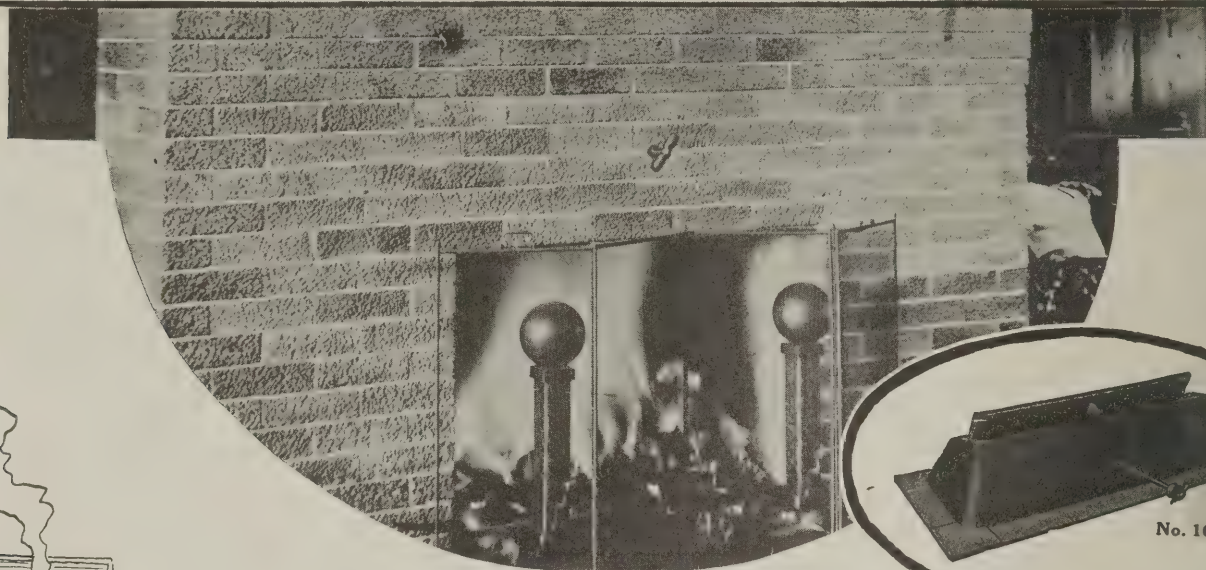
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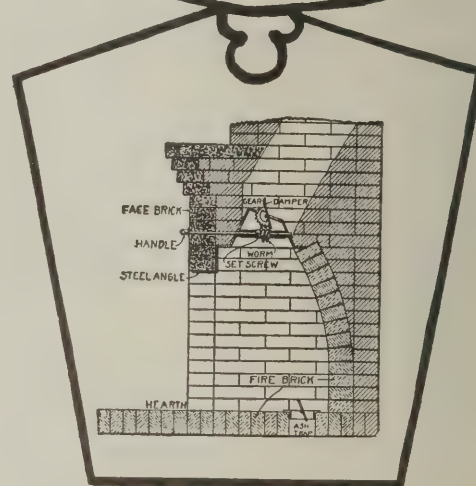
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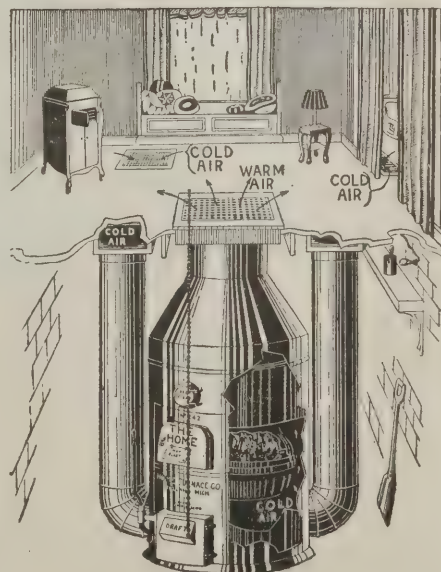
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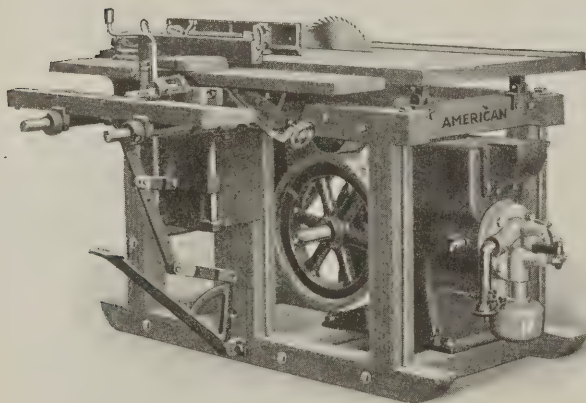
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Contractors' Woodworker

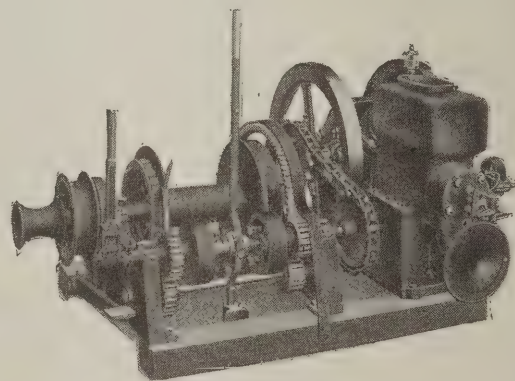
You'll never realize what a time-saver this "American" is until you've put it at work on your own job. Then—watch everything speed up. You'll have a small sized planing mill right on your work, on which you can handle almost any job that will come up in the ordinary building contract. Best of all—you'll find the "American" isn't a one-season machine. It has the built-in stand-up-ability that keeps it on the job, month after month, year after year. Write for the Woodworker Bulletin, No. 67.



"American" Variety Woodworker with Gasoline Engine Built In; Also Made with Self-Contained Electric Motor or for Belt Drive

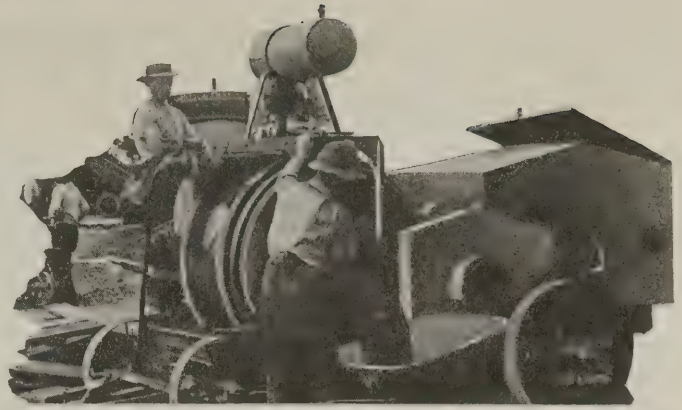
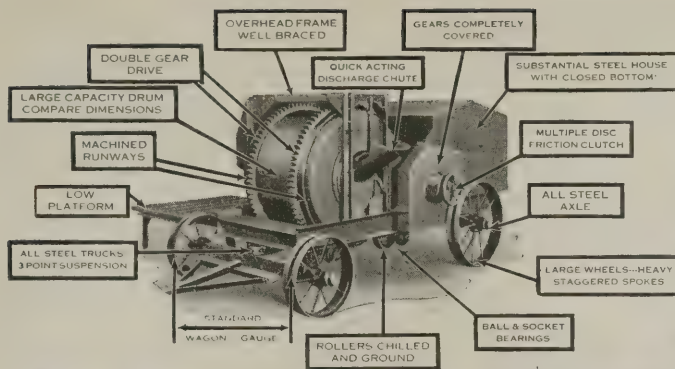
Contractors' Hoist

When it comes to the lifting and handling jobs, this "American" will surprise you with the time it gains for you, the speed it puts into the work all along the line. When it's a question of finishing up one job quickly and getting on another soon, this hoist will take up the lost motion and reduce non-productive time in a way that spells profit. And you can figure the price of this "American" as a permanent investment, because "American" quality means long-time service at lowest up-keep cost. Write for the Hoist Bulletin, No. 10.



"American" No. 4 Hoist with Self-Contained Gasoline Engine. Also Made with Built-In Electric Motor or for Belt Drive

American Saw Mill Machinery Co.
1361 Hudson Terminal **NEW YORK CITY**



DANDIE

The Big Value Light Mixer

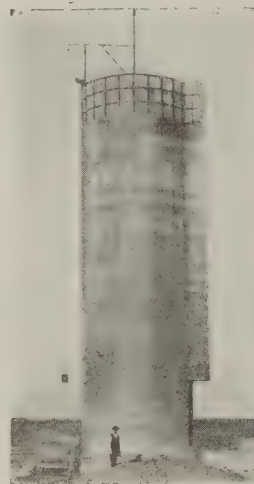
Send back the coupon at the bottom of this page—and get the full facts about the remarkable value of the light mixer field—the light mixer built first for **reliability**, and then built in **volume** to keep the price down.

No, sir, the Dandie is not the cheapest mixer—it is the first light mixer built as strong as a light mixer can be built. It stands up to all the work you can give it—is dependable to stick on the job without costly delays.

But the price is within the range of light mixer prices—that is why it is the **remarkable value**—you are surprised that you could get such construction for the price. It is only made possible by scientific design, big production and standardization

of every part. This is how we get the price down, not by skimping.

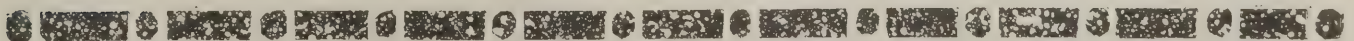
Get the Dandie Catalog—get the full details of how volume production has put new reliability into the lighter mixer field—see for yourself why the Dandie is the remarkable value of the industry.



4 cu. ft. and 7 cu. ft. capacities Wet Batch Rating. No. 104-S, gasoline, No. 107-S, steam or gasoline. May be equipped with low charging platform, power charging skip, automatic water-measuring tank and light duty hoist.

The Big Yardage Mixer for Footings, Sidewalks, Silos, Culverts, Etc.

SEND BACK THIS COUPON



KOEHRING MACHINE CO., Milwaukee, Wis.

Please send, without obligation, your Dandie Big Value Catalog S-5, and advise me where I can see a Dandie Mixer.

Also send me information on items marked X in ☒

☐ Bar Benders

☐ Bar Cutters

Name

Address



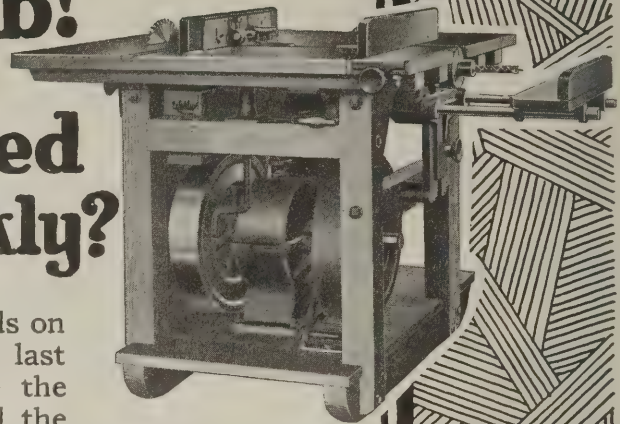
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Are You Equipped to Finish It Quickly?

Very often getting the next job depends on the speed with which you finished the last one. The quicker you finish one job the sooner you get to the next one—and the **MORE PROFIT** you make. That's just horse sense.

It is just such equipment as the Eveready Saw Rig that will speed up your work—put you away ahead of your competitors. The



EVEREADY Saw Rig

will not only do all the sawing on any job and do it much faster than it could be done by hand, but it cuts your labor costs at least 50%. Two men can work on opposite sides of an Eveready at the same time.

The Eveready is a whole planing mill in itself.

Joints, tenons, rabbets, mitres, bevels, rip-saws, cross-cuts, jig-saws, grinds, bores and sands.

Readily portable—can be set up anywhere. Built exceptionally strong—will last practically a lifetime. Self-powered by a simple, durable gasoline engine that furnishes ample power for all uses.

The building boom is here. Be prepared. Get our "Book of Evidence." It's free—and tells you all about the Eveready.

Oshkosh Mfg. Co.
316 Natic St.
Oshkosh
Wisconsin



Here Are Two Letters Selected at Random from Our Files

Palmer, Neb.

OSHKOSH MFG. COMPANY,
Oshkosh, Wisconsin.

Gentlemen:

We are using one of your Eveready Saw Rigs here, which I bought about a year ago, and we are certainly pleased with the performance of this machine. I feel that the machine has paid for itself since we bought it.

Yours very truly,

S. A. FOSTER LUMBER CO
—O—

Ames, Iowa.

OSHKOSH MFG. COMPANY,
Oshkosh, Wisconsin.

Gentlemen:

I have one of your Eveready Rigs and keep it in my shop and do a great deal of shop work on it. I find it very handy and always ready to work when it has gas and oil.

Very truly yours,
U. S. GRIFFITH.



Expansion in the variety of our products has made a change of firm name imperative. Hereafter — because of the fast growing popularity of our added products—**Hoists, Pumps, Backfillers and Air Compressors**—we will be known as the **WATERLOO CONSTRUCTION MACHINERY COMPANY**.

Our institution has enjoyed astounding growth. With this growth has come commercial muscle — strength and stability. It proves that our business motto: "The very best at fair prices," is the correct policy.

WATERLOO CONSTRUCTION MACHINERY CO.

111 Vinton St.

(Formerly the Waterloo Cement Machinery Corporation)

Waterloo, Iowa

Manufacturers of the **Original Wonder Mixer**

"The Mixer That Makes the Money" delivers five cubic feet per batch. (This is the Wonder No. 5.)

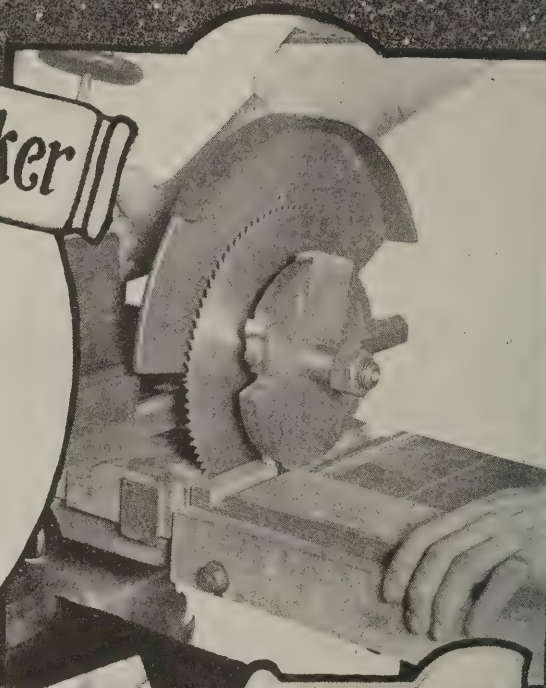
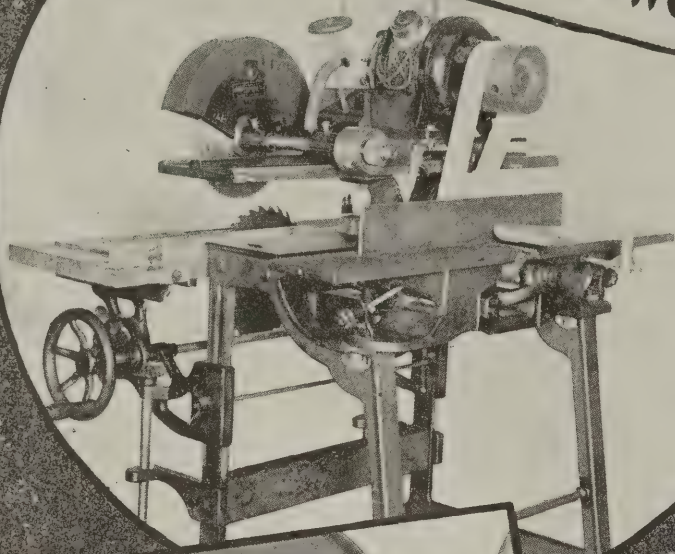
It is unexcelled for speed and perfect mix. Such declarations are often made by many, but because Wonder performance even surpasses our claims, it has come to be the nation's standard concrete mixer.



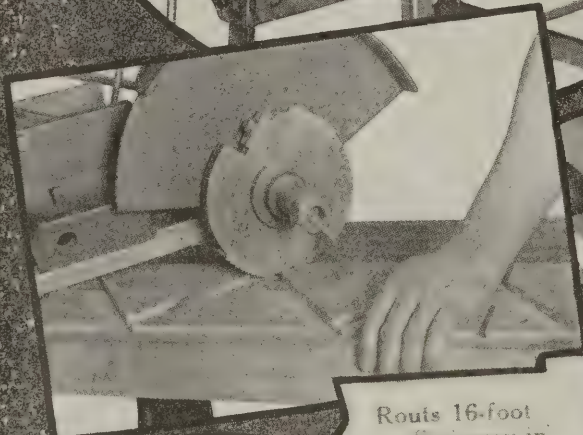
Conforming to the Standard adopted by the Concrete Mixer Association, the Wonder Junior becomes Model 3. Models 15, 17 and 20 become Wonder 4, 5 and 7, respectively.

The Paver will be known as the Wonder 7 Paver.

The Master Woodworker



Cutting and Routing
Side Door Jamb in
One Operation

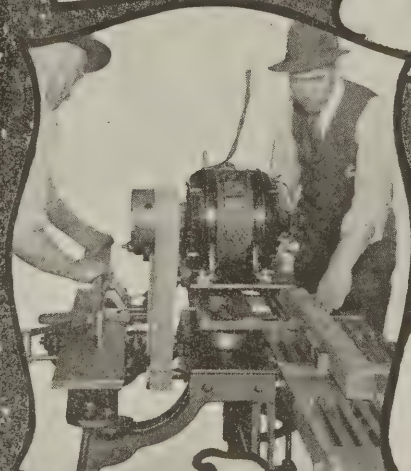


Routs 16-foot
Stairway in
20 Minutes

Boring



Cross
Cutting



Ripping and
Jointing

A Machine That Makes Every Cut on a Building!

A machine that makes every cut on a Building. Makes the finest cuts with great accuracy. Very speedy on rough work. A real machine tool.

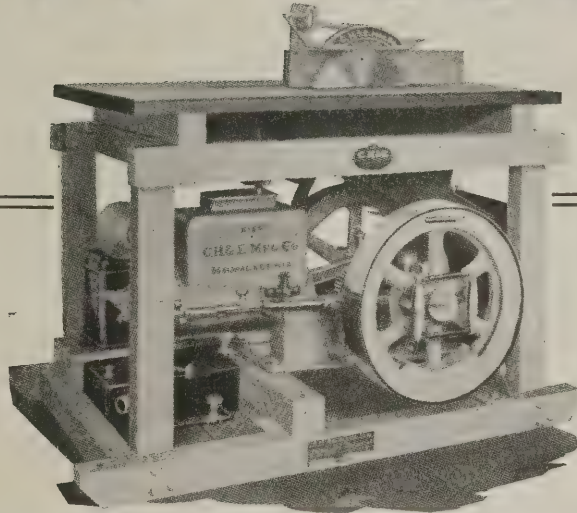
Runs by electric or gasoline power. Weighs 750 pounds. Exceedingly easy to move about; divides into four parts by simply loosening four bolts. Heaviest section is 200 pounds. Can be carried through a 2' 6" door by the removal of table. Note that the lumber always runs in same direction for all operations.

Let us give you full particulars about this wonderful asset to your business. The purchase of a "Master" Woodworker will be the best investment you ever made. It will handle all your work and the first cost is the last cost. Distributors—Patterson, Gottfried & Hunter, N. Y.; Stambaugh-Thompson Co., Youngstown, O.; Geller, Ward & Hasner Co., St. Louis, Mo.; Schoedinger-Marr Co., Columbus, O.; J. T. Lane Equipment Co., Springfield, O.; Illinois Engineering & Machinery Co., Chicago, Ill.; Toledo Railways & Light Co., Toledo, O.; Morris Bros., Hammond, Ind.; Brown & Seymour, Mansfield, O.; Knack Bros., Niagara Falls. Other territory open for dealers.

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Complete
Sizes*



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Saw Rig With 4 h. p.
Gasoline Engine*

**Also Hoists,
Mortar
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and Elevator**

**Gasoline
and
Kerosene
Engines**

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Patented

Sliding Garage Door Hardware

"I have used all the different kinds of hardware to equip garage doors and I consider 'Slide-tite' the best on the market today."



WEATHER-TIGHT

Doors hung on "Slidetite" Hardware slide and fold tight into the door frame like a house door, saving heat and keeping out the weather. Operate easily. Can't sag. Stand immovable without locks or holders. Make a fine looking garage.

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"A hanger for any door that slides"

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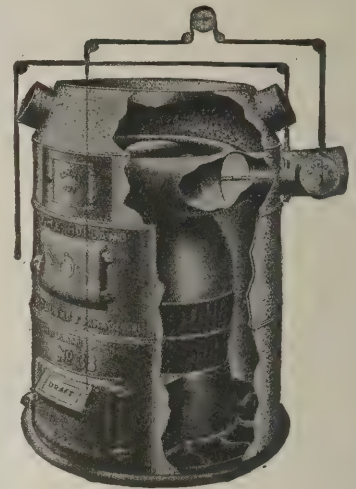
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Put HOLLAND Furnaces in the houses you build, and prove to your clients that you know how to give them maximum comfort, convenience and economy. HOLLAND Furnaces will insure the popularity of your houses and will distinguish you as a master home-builder.

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Make Warm Friends

This slogan comes to one's mind as naturally as breathing, because every HOLLAND that is sold, sells many more. The HOLLAND is the simplest, strongest furnace made. We sell on a positive guarantee, because we know why we can do it.

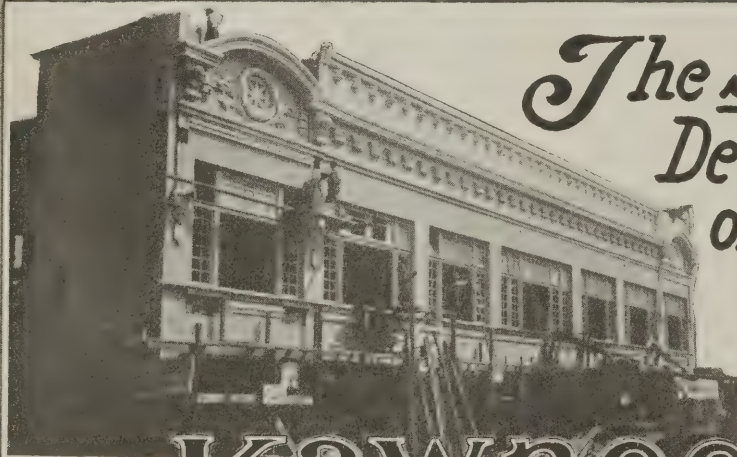
Our Heating Engineering Department is at your service. We have an excellent proposition for Contractors and Builders. Write and let us tell you about it.



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Factories: Holland, Michigan; Cedar Rapids, Iowa



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Kawneer

Store Front Construction

will show up this building—or any other—at its best. Since Kawneer Fronts were invented, some twelve years ago, over 75,000 have been installed. This proves their worth from an architectural and sales-pulling standpoint.

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We help you in every way possible to make the job satisfactory. Service has been a big reason for Kawneer progress. Besides putting out the best material, we make every effort to design the proper front for the building in question.

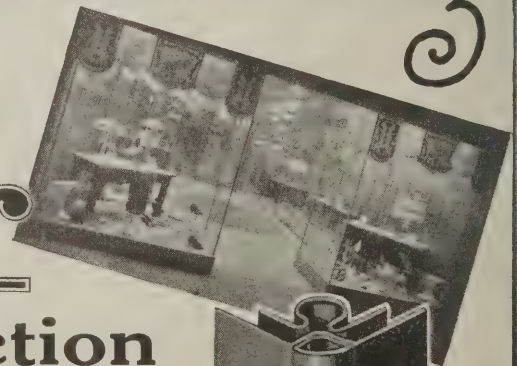
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WHEN YOU SCREEN A PORCH install Portable PEARL Screen Panels which lock together and close in the open sides of the porch. This creates a room which allows out-of-door living, a cool, shady retreat by day, an open air sleeping room by night—protected against disease-carrying flies and mosquitoes.

AS SHOWN IN OUR BLUE PRINT porch plan, sent free for the asking, these panels can be set up by anyone in a short time and are as easily taken down for winter storage.

PLAN ALSO FOR LONG LIFE IN screening by specifying PEARL Wire Cloth. Back of the enormous and steadily increasing sales of PEARL is its unusual wear quality due to its metallic coating—a special process owned and controlled exclusively by us. Longest lasting—therefore costs less in the long run—besides needing no paint or repairs. The most handsome and sanitary wire cloth on the market today.



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It has two copper wires in the selvage and our red tag on every roll.

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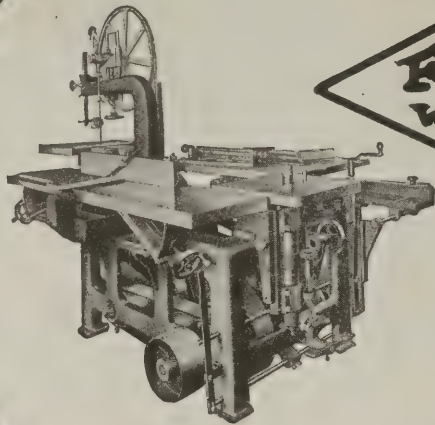
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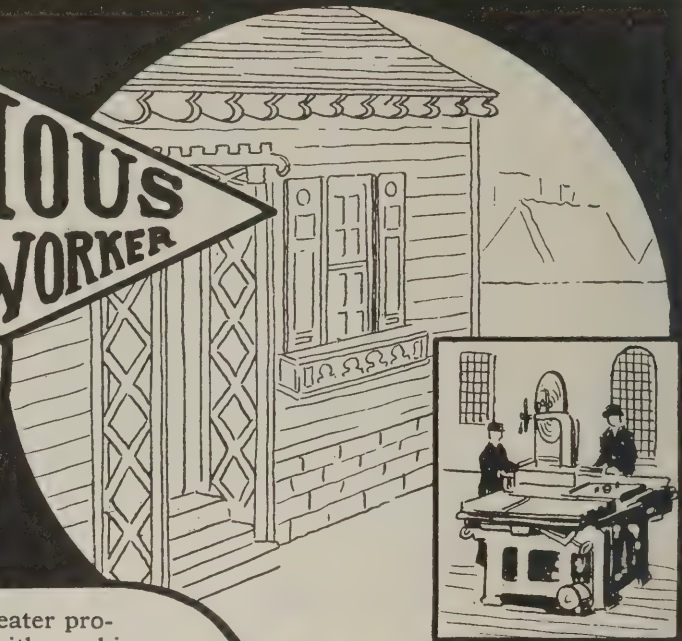
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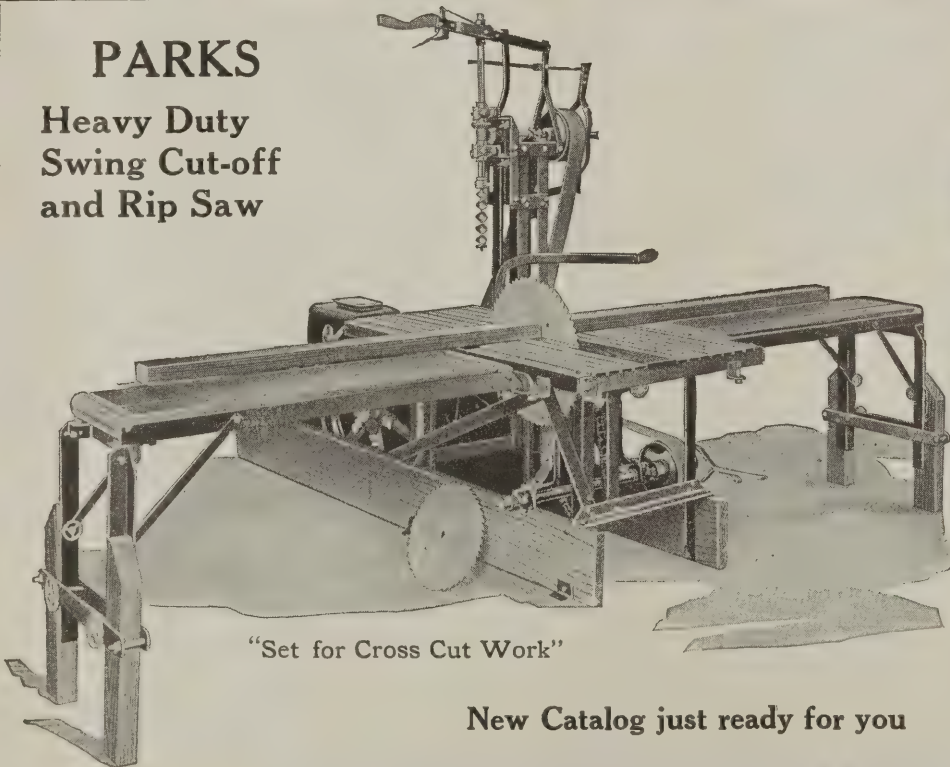
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Many models—at varying prices. Our catalogue gives you an exact knowledge of the Famous line. Get it.

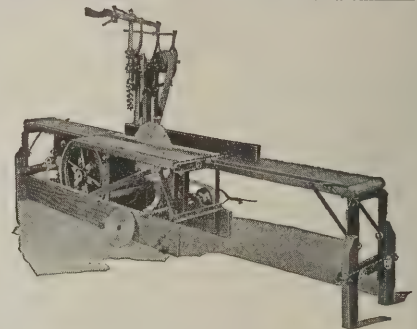
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SIDNEY, OHIO

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**Heavy Duty
Swing Cut-off
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Self-furring. Heavier than other metal laths of same gauge because cut with wider strands. Best for interior as well as for exterior work.

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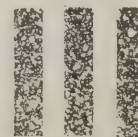
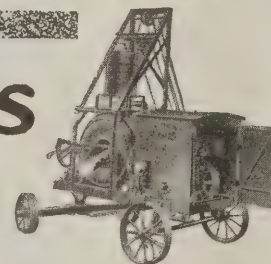
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Northwestern Steel & Iron Works, Eau Claire, Wis.



"The Standard" Low Charging Concrete Mixers

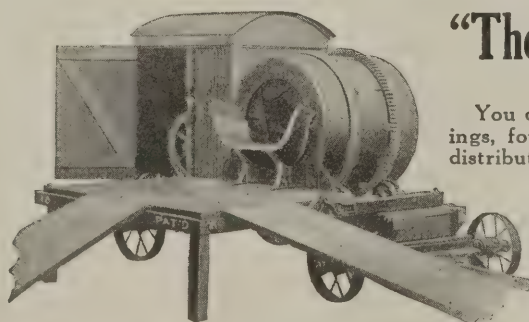
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You can work "The Standard" Mixers on jobs of any size. On big jobs of buildings, foundations, columns, and floors, the flexible "The Standard" Mixers may be distributed over the job close to the forms—or assembled in a battery at a central tower plant.

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The light weight and easy portability of "The Standard" Mixers aid your foremen to RUSH a job.

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It is Really a Shingle

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A quick, easy job for the men. The completed roof costs no more than dipped shingles and is twice as serviceable. Winthrop Tapered Asphalt Shingles are used and recommended by hundreds of contractors. Made in two colors—red and green. Beautiful color effects are possible.



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IT WILL EMERGE 16 INCHES
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*"Handsome is as
handsome does"*
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VIEW
SHOW'N

IS A
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Guaranteed

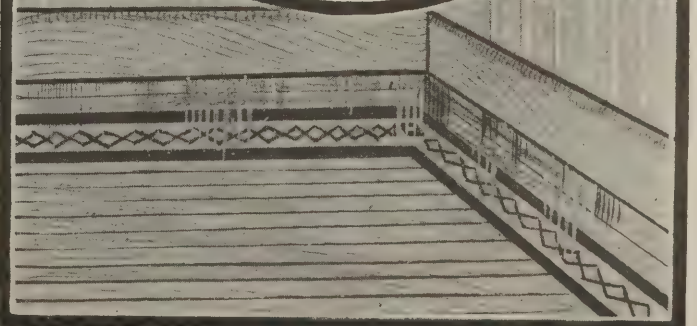
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Our new line of steel ceilings is original in design and decorative to a degree never before attained. The requirements of the builder as well as the preferences of the owner have been skillfully embodied in our products.

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502 Ellsworth Ave. Grand Rapids, Michigan



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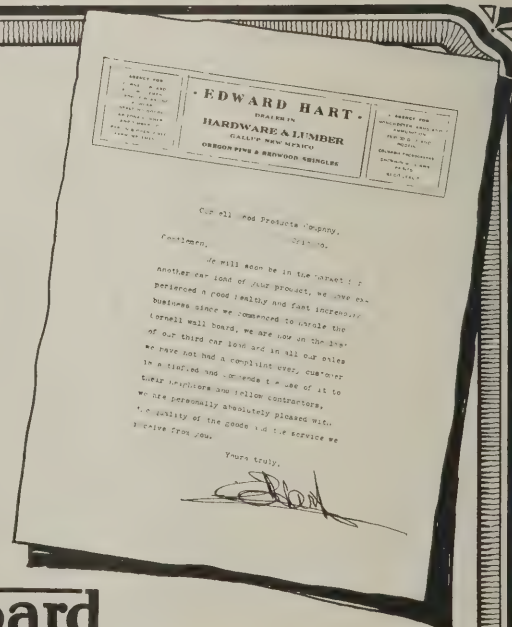
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scientifically constructed and concealed

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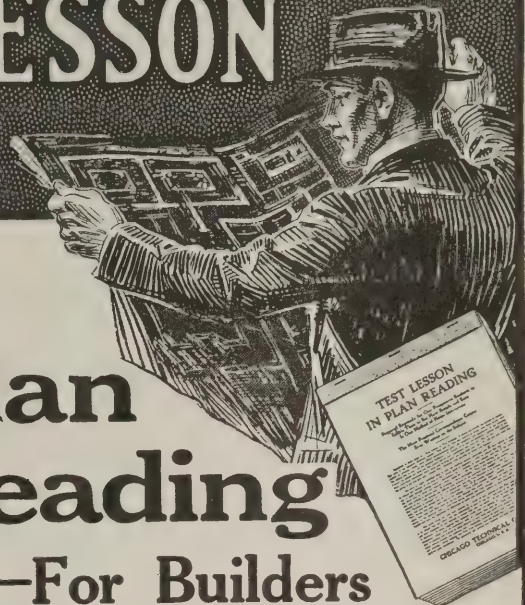
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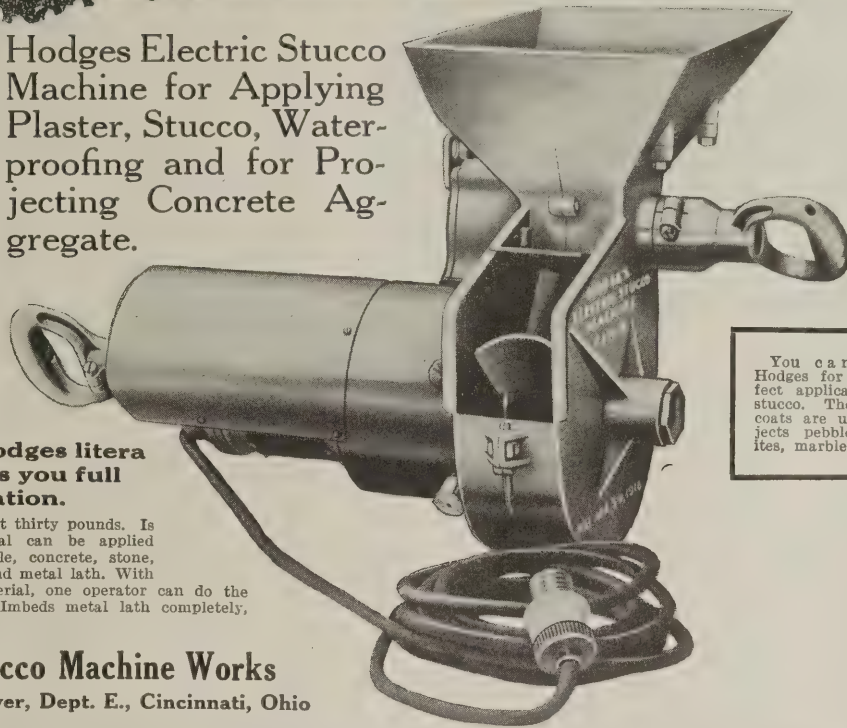


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Hodges Electric Stucco Machine for Applying Plaster, Stucco, Waterproofing and for Projecting Concrete Aggregate.



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The Hodges weighs but thirty pounds. Is easily handled. Material can be applied against brick, hollow tile, concrete, stone, concrete blocks, wood and metal lath. With a helper to supply material, one operator can do the work of several men. Imbeds metal lath completely, preventing corrosion.

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No. 640

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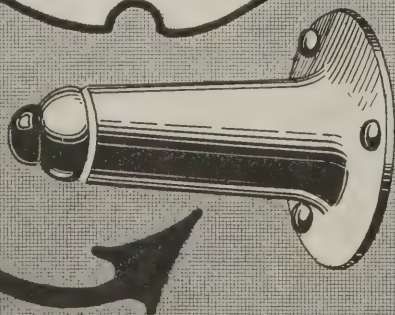
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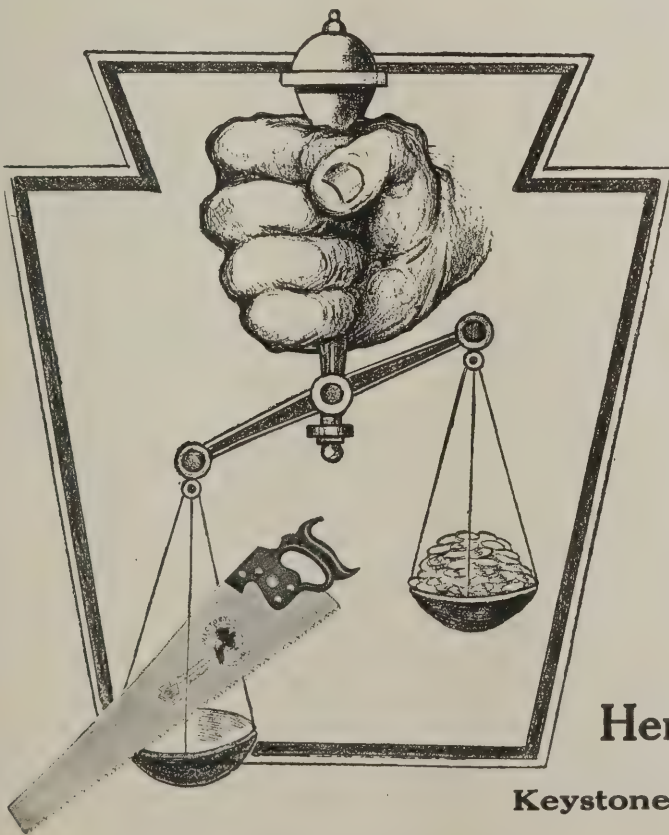
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Because the *straight* track permits *space saving*, folding-sliding doors.

Because the *straight* track does away with the *extra labor, extra cost*, of the extra arm the curved track requires.

And only with the *offset hinge* door hanger—exclusively a Porter product—can the straight track be used. This exclusive hanger takes all the burden that a curved track or spring must provide for without it.

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Storms can't blow in doors hung with the Straight-Away; snow and ice can't jam the sills.

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One needs no expert help to put up the doors with this complete set—6 feet of track, tandem-track hanger, chain-bolts, latches, door pulls, hinges, screws, etc.—all adapted for three doors of any size, though designed primarily for the standard "2-foot-8 by 8" doors obtainable anywhere.

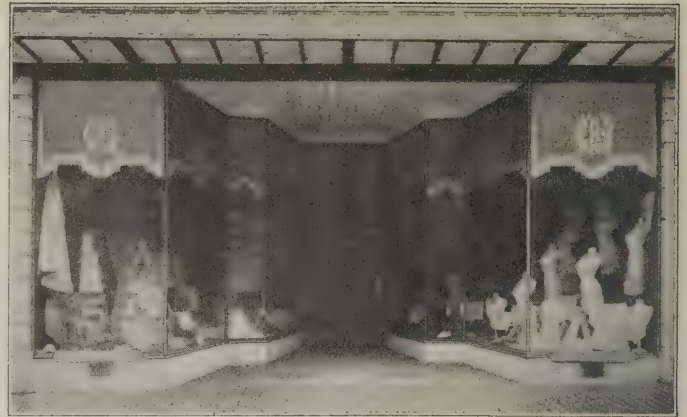
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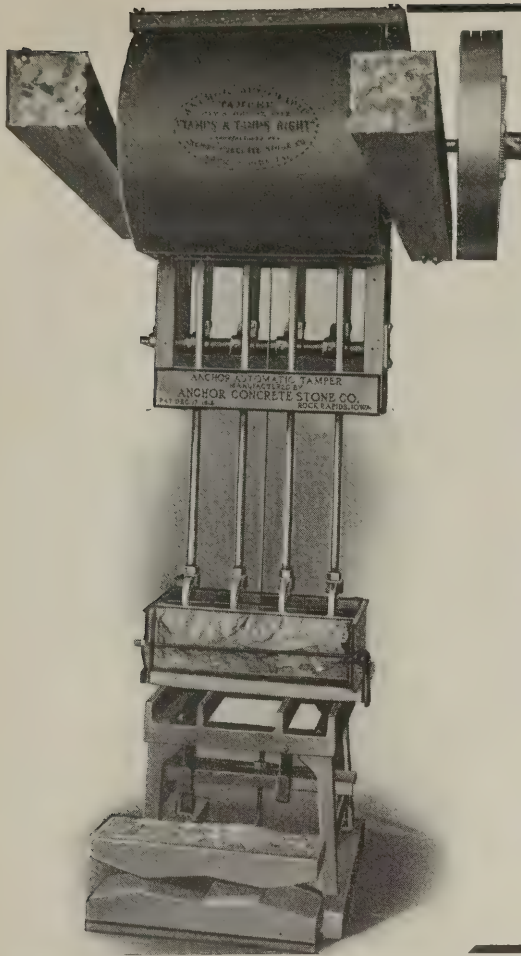
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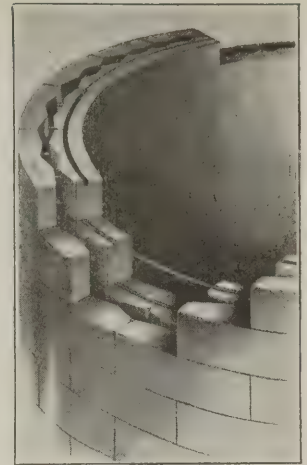
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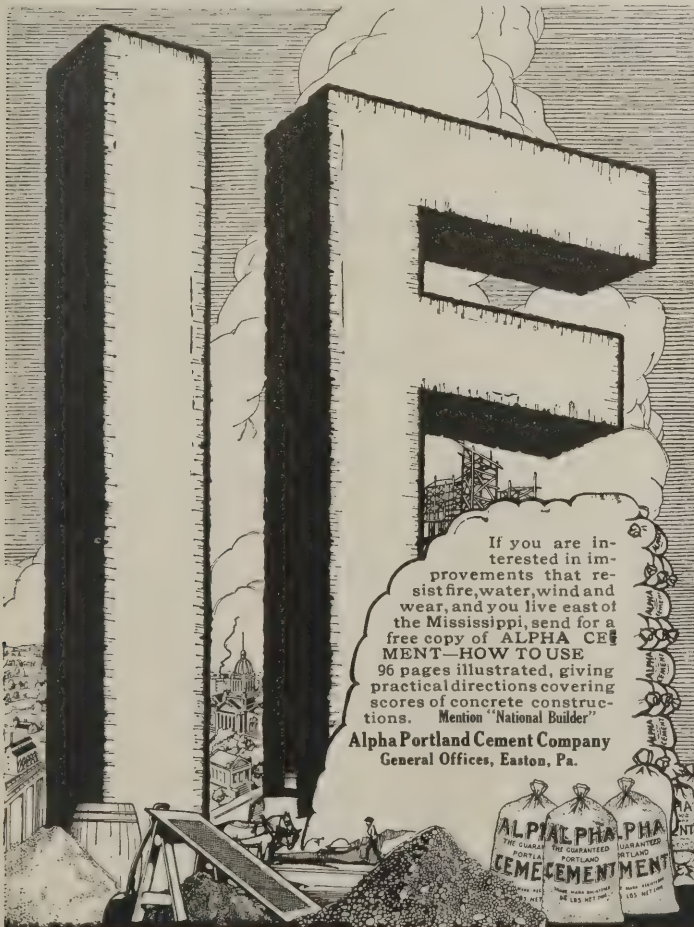
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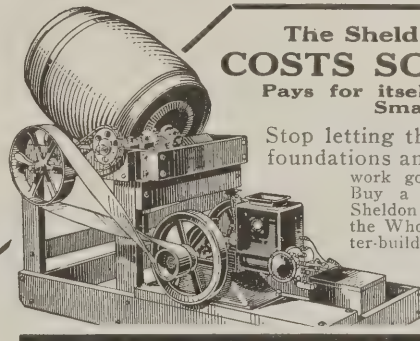
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Pays for itself on the First Small Job

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Sheldon Concrete Mixers

Save Time, Save Labor, Save Money

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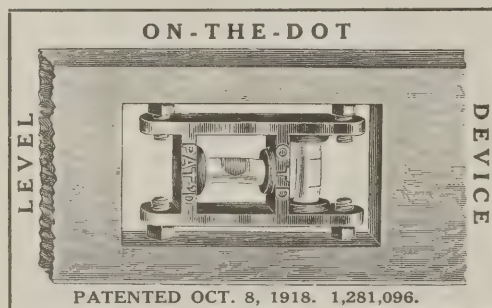
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An O-T-D Level ($3\frac{1}{4}'' \times 1\frac{7}{8}''$) Serves the Purpose of Both



Guaranteed absolutely accurate—will true a master square

To use in leveling any surface Quickly and Accurately: As shown above, make a cut $1\frac{7}{8}''$ wide in a board of any desired length, and insert the O-T-D; adjust screws at sides until spirit is level. Accuracy is assured.

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The price is \$2.00.

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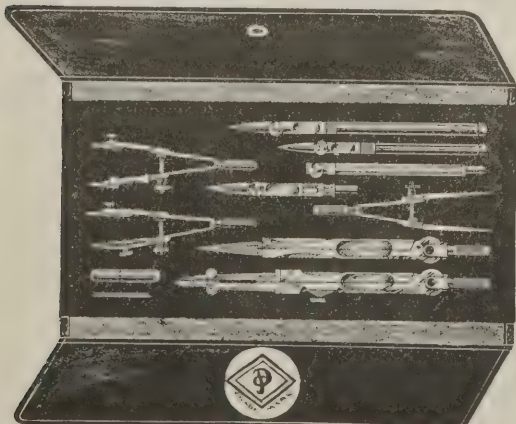
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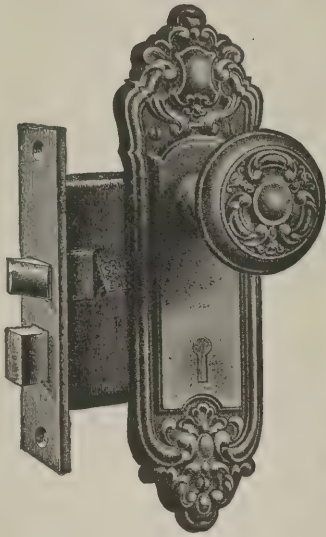
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cast bronze front and bolts.
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Special at

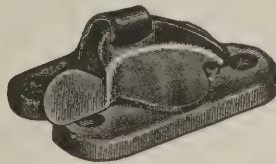
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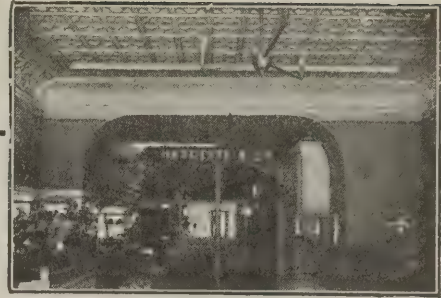
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The World's Largest Manufacturers of Metal Roofing, Metal Shingles, Metal Spanish Tile, Metal Ceilings, Metal Garages, Portable Buildings, Metal Lockers, Rolling Steel Doors, Partitions, etc.

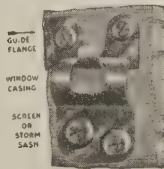


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Kees (Gossett) Screen and Storm Sash Hinges

make hanging so easy.
That's why you should use them.

They're the most up-to-date device on the market. They're one of the big little things that insure satisfaction of the owner—and so reflect credit on your alertness and judgment.



Kees Metal Building Corners



look classier than corner strips and are better because the corners can't warp open or split—besides making a quicker job for you.

The owner will be pleased because they're plain and produce the uncommon, artistic mitered effect economically.

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Sold by most hardware and lumber dealers, or direct, if yours can't supply you.

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BERGER'S
STEEL CEILINGS

Offices, Twelve Stores,
and the Theatre itself
have Berger Steel Ceilings.

Berger steel designs cut down "overhead" expense. At the same time they make interiors very attractive.

Better investigate. Write nearest Berger Office for full information and Catalog D47.

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If you will send us the exact size of your customer's floors, we will send you a sketch with exact estimate of cost of the material required.

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Wood-Mosaic Co., Inc.
New Albany, Indiana

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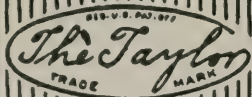
The same thing goes for live lumber dealers. Just a little pushing, just a little up-to-date selling will soon start a desirable trade for you in OAK FLOORING. Every house refloored is pretty sure to mean two or three more orders from the neighbors. Send for our printed matter. It pays.

OAK FLOORING MANUFACTURERS' ASSN.

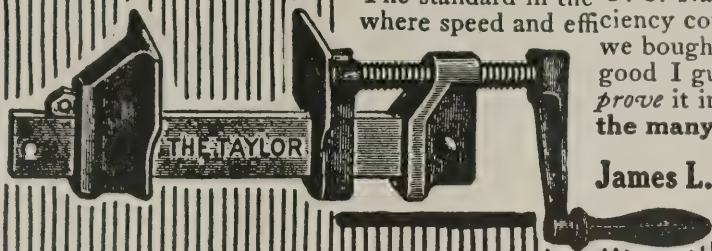
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Something New

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Write for full details
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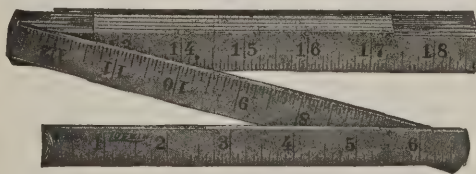
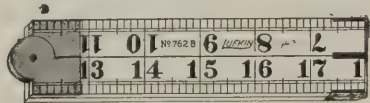
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Windsor, Canada

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No other refrigerator has as many valuable features as the Herrick—it is in a class by itself. This is why you are safe in specifying this master refrigerator. Wherever a Herrick is installed, refrigeration troubles disappear. This does not surprise us, for more money is spent on Herrick improvements than most refrigerator manufacturers think necessary.

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Here's an opportunity to make bigger profits for yourself—a Chemical Closet which you can sell to home builders with a profit at a less price than the wooden privy.

Economy Chemical Closet

The world's best. A sanitary indoor closet which can be set up in the best room in the house—positively kills all germs and odors. It does away with the outdoor privy, and the NU-WAY gives comfort and convenience where there are no sewer connections.

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We want one live contractor or builder in each town to act as our agent. Good profits on your sales. We assist you to sell them.

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—No Odor

A Modern Convenience — A Real Necessity

**Carpenter and Contractor Agents
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Sales Easily Made. Profits Liberal. You sell the first one. It will sell the rest. Every home without sewer connection needs one.

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A BIT OF UTILITY

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction. Doesn't matter how hard the wood is, no consequence whether it

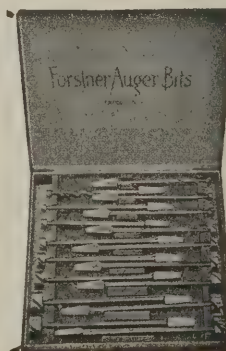
is full of knots, or the grain awkward to negotiate.

The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

Unequaled For Delicate Work

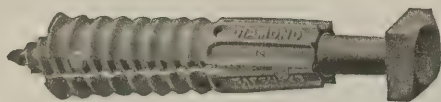
Supersedes chisels, gauges, scroll-saws, or lath tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do

more work than other bits and cost no more. We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.



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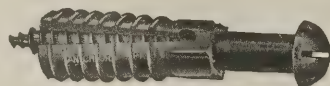


Patented

Quality exists to some degree in most expansion bolts.

Distinctive Quality is what has caused the "Diamond N" to be the most copied expansion bolt ever produced.

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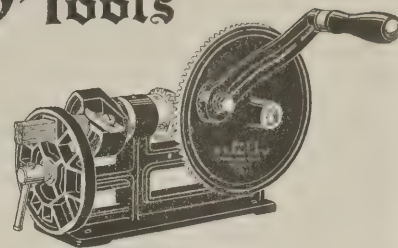
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Mfrs. of Diamond Specialties

90 West St., Corner Cedar, New York City

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Stanley Dowel and Rod Turn- ing Machine No. 77



A tool for Carpenters, Cabinet Makers, Pattern Makers, Furniture Manufacturers. In fact for anyone interested in woodworking.

With this machine the workman can cut his dowels when he is ready to use them and furthermore of the same material as the wood being worked.

One cutter head complete for making dowels or rods 3/8 inch in diameter is furnished with each machine.

Additional cutter heads with cutters 1/4, 5/16, 7/16, 1/2, 9/16, 5/8, 11/16 and 3/4 inches can be furnished if desired.

A workman whose tool equipment includes one of these machines and a Stanley Doweling Jig can make doweled joints with surprising quickness and accuracy.

Price, with 3/8 inch cutter head, \$8.50
Additional cutter heads, 80c each

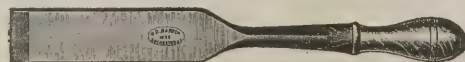
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determines the quality of chisels and other woodworking tools. It is a delicate process, requiring not only accurate working temperatures, but skilled workmen.



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are made from selected steel. After forging it is treated to secure temper without brittleness. An advantage of the Mack process is that tempering is done at comparatively low heat as the metal is not "burned."

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Write for "True Stories," which was written by carpenters all over the country

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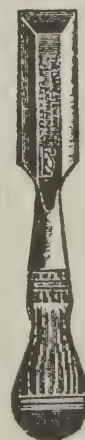
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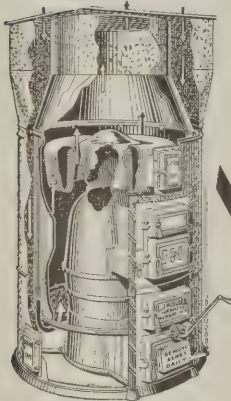
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It will cut perfect grooves of any width, either with or across the grain, and makes the most intricate cutting seem easy.

Will fit any saw manderel or rig and has simple no-screw adjustment.

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Silver Band Saw

Operator can shift belt, adjust wheel, tighten saw, lower or raise guide, tilt table, without changing position.

The care exercised in correctly manufacturing each part and in putting these parts together is exceptional.

But there is a rich reward for this close watch. As a result of it, Silver machines always reach our customers ready to produce perfect work for long years to come.

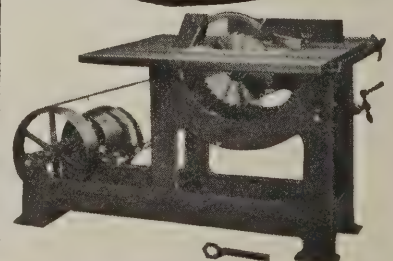
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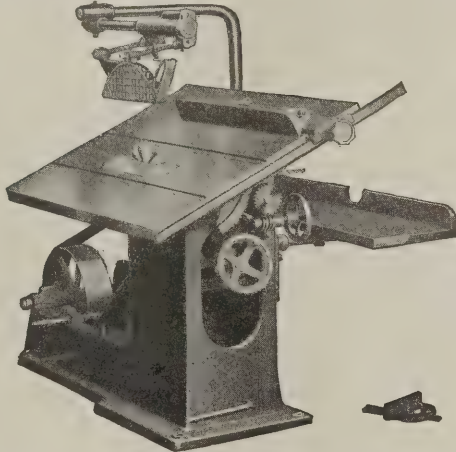
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is built for continuous, exacting service and always meets the requirements of those particular users who want the best.



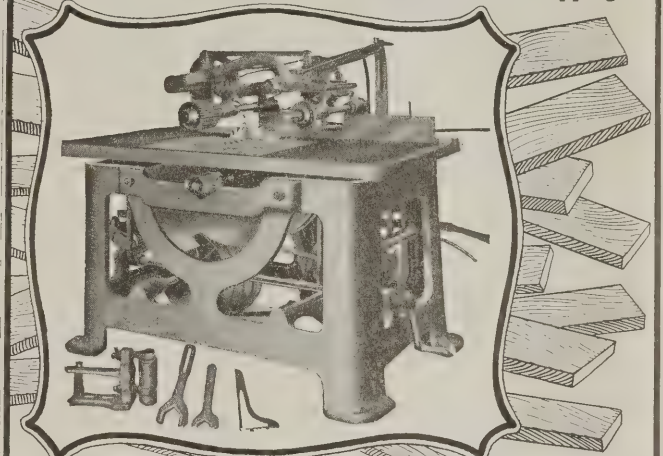
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Made Combination for Power and Hand Ripping



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You have seen all varieties and makes of self-feed rip saws. But until you have seen the Hoosier you have not laid your eyes on the machine that is producing the greatest amount of super-quality work with a minimum of attention in a minimum of time.

The Hoosier Rip Saw is built with hinged upper feed works so it can be used for both power and hand ripping.

This No. 1 Hoosier has seven brothers, built for all kinds of special ripping. Ask us for literature on these rip-saw marvels.

We also make the Hoosier Automatic Cut-Off Machine

The Sinker-Davis Co., Indianapolis, Ind.

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You can easily rip 6,000 feet (lineal measure) of one inch pine in a day. No skill required.

The "Barnes" will rip hard or soft wood boards of any thickness up to 3 3/4-inch and any width to 19 inches. Feeds slow or fast as desired.

It's a money maker and a time saver.

Send for prices and catalogue of woodworking machinery



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has no equal. It is economical, easy to lay, will not rot, stretch, shrink or peel.

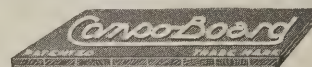
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The **only** wall board which is built with a core of kiln-dried wood slats is



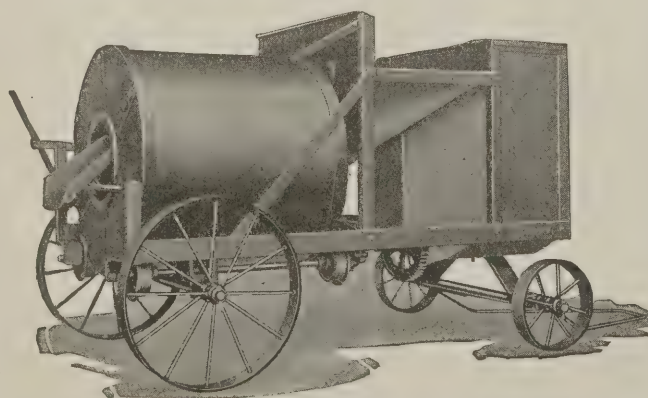
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It is the modern wall lining with strength, durability, moisture-proofness, decorative adaptability, non-warping, non-shrinking qualities. When buying look for the wood core and the name "Compo-Board" printed upon it.

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Bolte Mixers have four actual features that will strongly appeal to you: Capacity—Portability—Simplicity—Durability.

Our literature illustrates and explains both "Bolte" and "Handy" Mixers. Ask and we will send it immediately

THE BOLTE MFG. CO.
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Caldwell Sash Balances Uniform Mortises

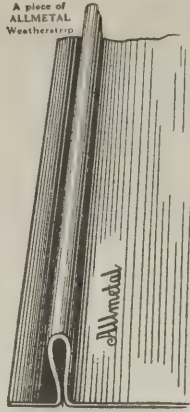
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EASY To Sell

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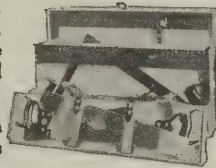
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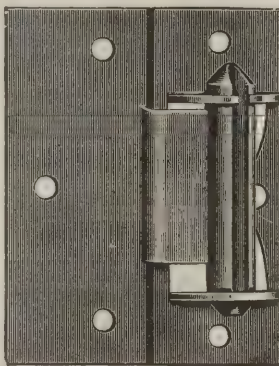
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Pearson Manufacturing Co.

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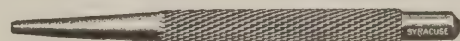


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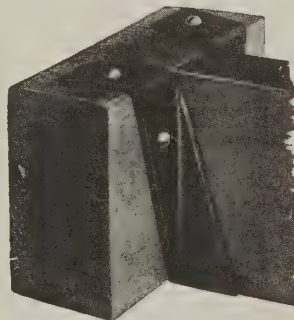
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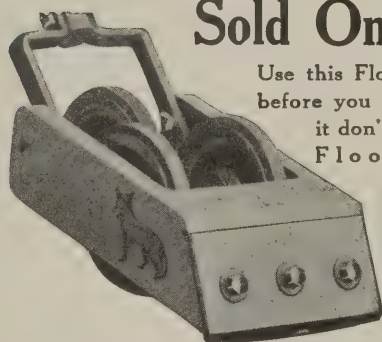
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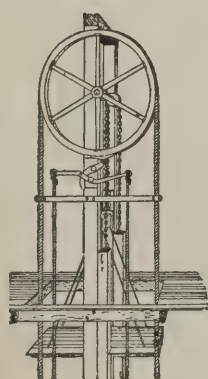
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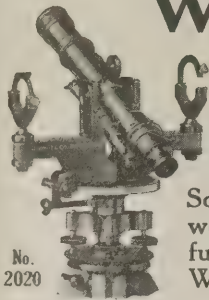
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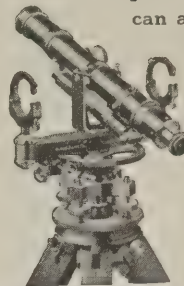
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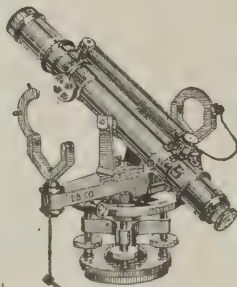
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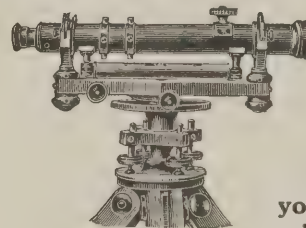
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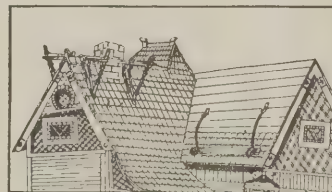
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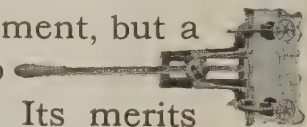
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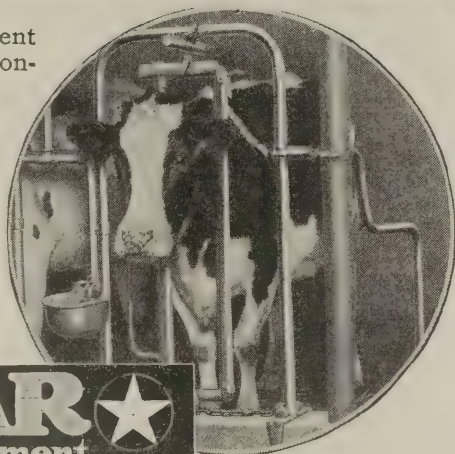
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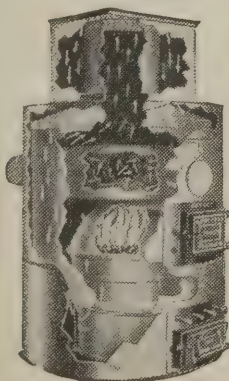
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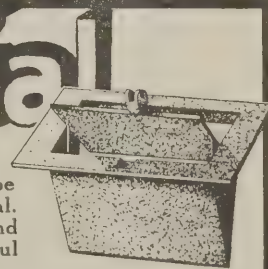


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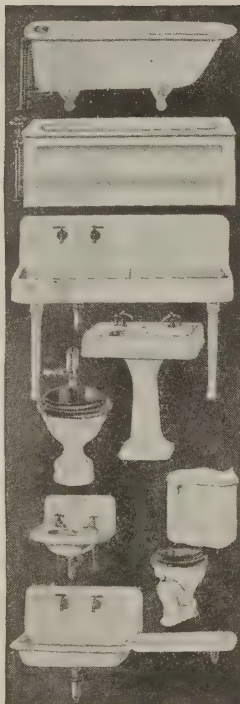
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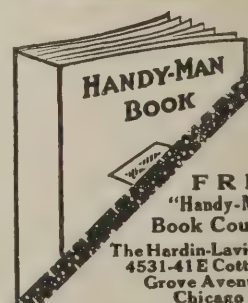
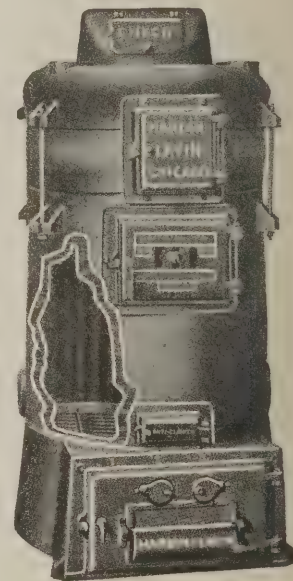
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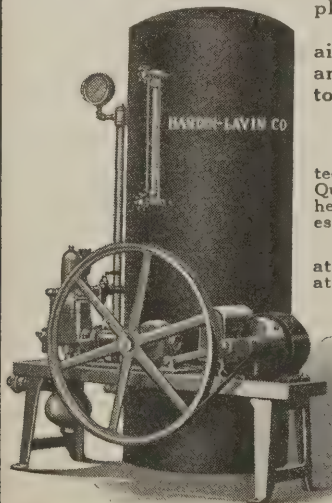
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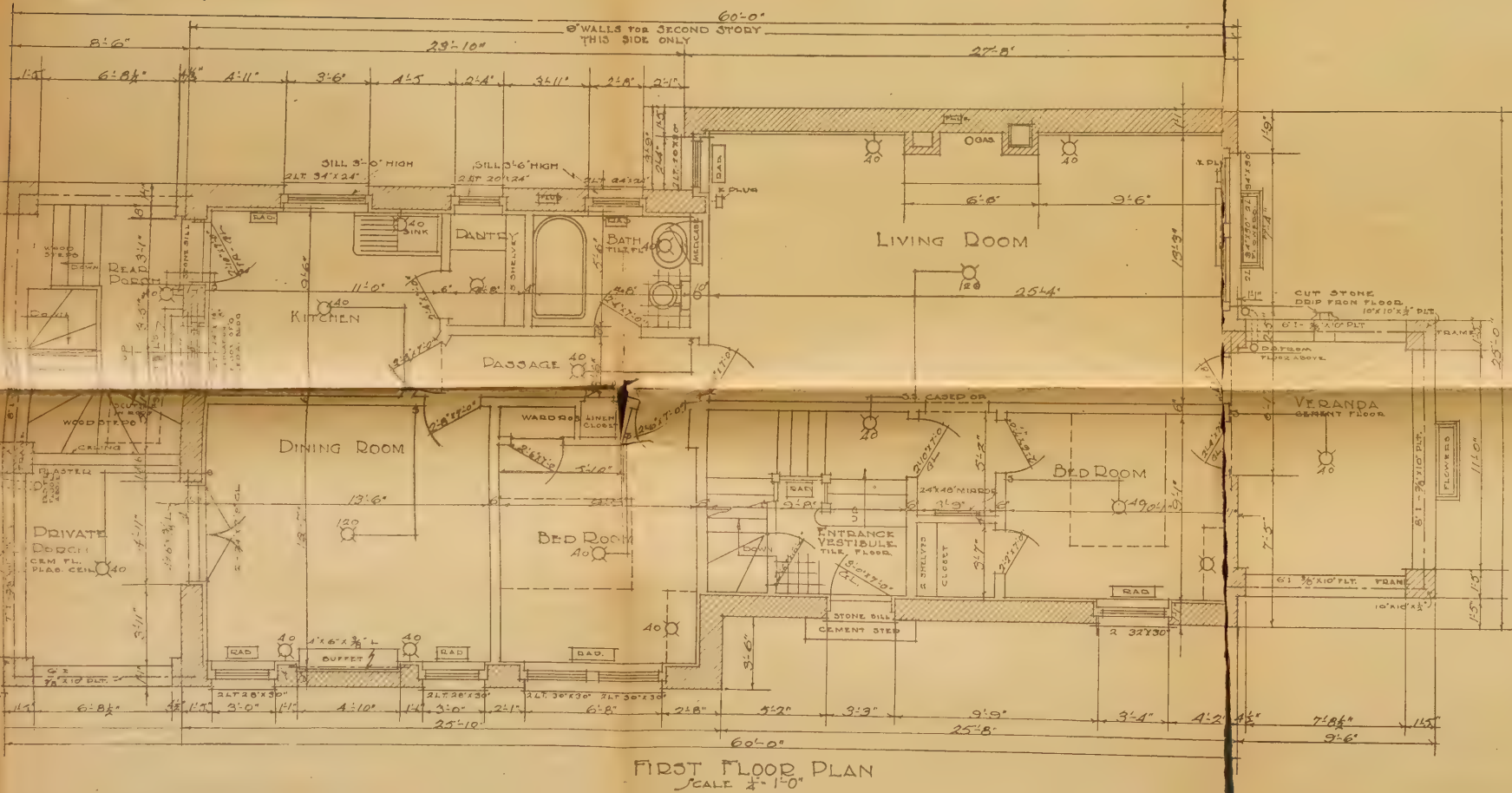
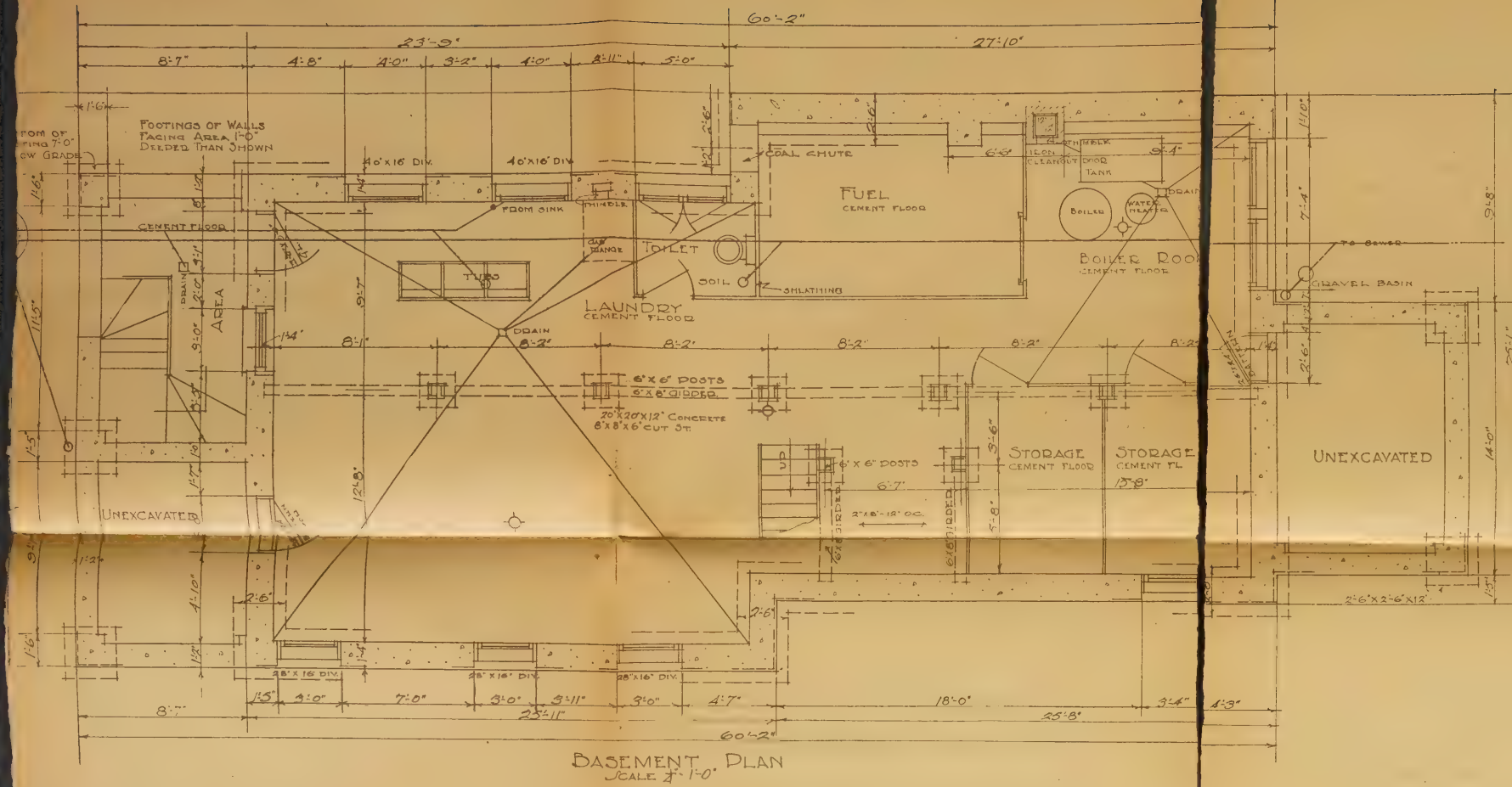
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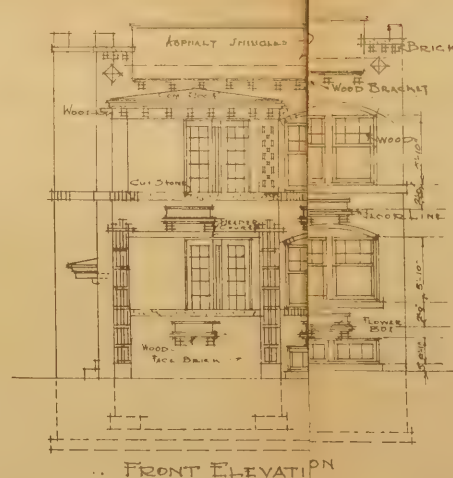
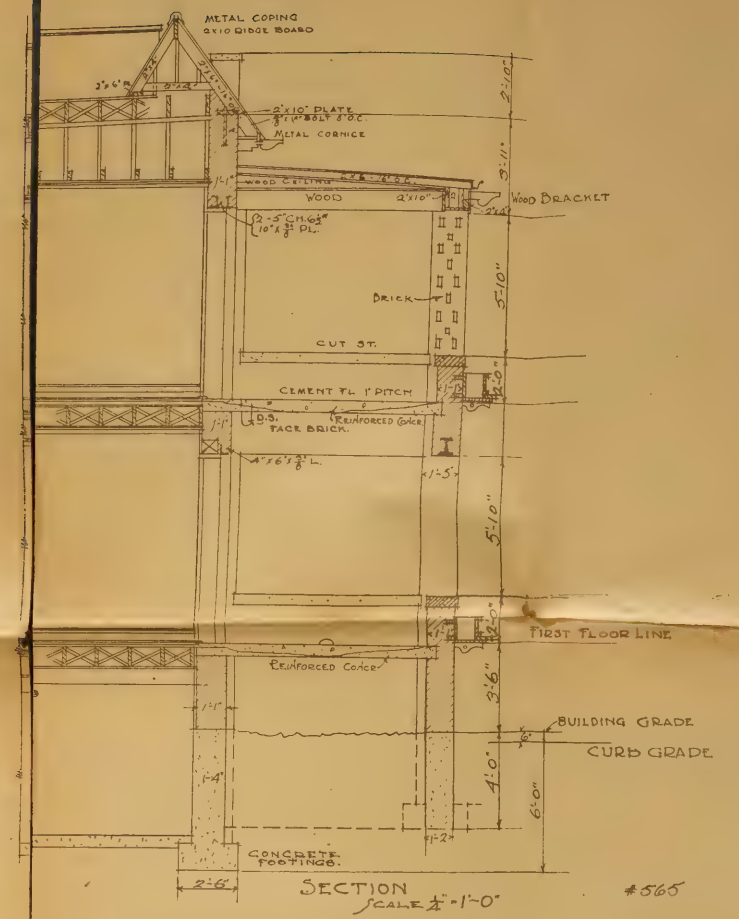
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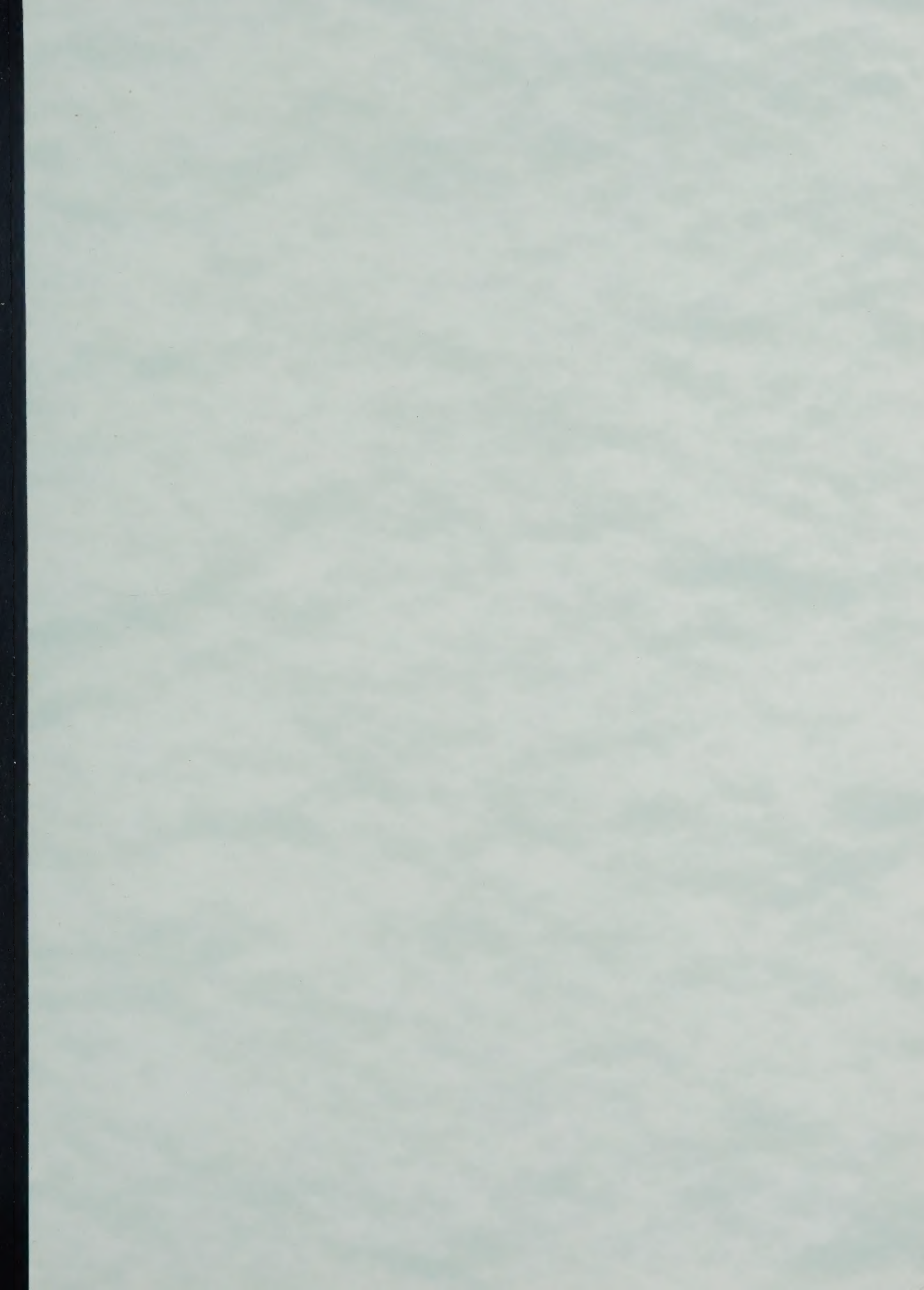
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